

Interface-Covalent Coupled Zeolite–Graphene Oxide Membranes via NaOH-Induced *In Situ* Crystallization for Robust Radionuclide Adsorption

Ge Yang^{a, b}, Yaozuo Zhou^b, Mengling Sun^b, Lei Zhao^c, Hao Wu^b, Hailing Guo^{b, *}
Soryong Chae^d, and Svetlana Mintova^e

^a College of Chemical Engineering, Qingdao University of Science and Technology,
Qingdao, Shandong 266042, P.R. China.

^b State Key Laboratory of Heavy Oil Processing, China University of Petroleum (East
China) Qingdao, Shandong 266555, P.R. China.

^c Interdisciplinary Institute of NMR and Molecular Sciences, Hubei Provincial Laboratory
for Coal Conversion and New Carbon Materials, School of Chemistry and Chemical
Engineering, Wuhan University of Science and Technology, Wuhan, Hubei 430081, P. R.
China

^d Department of Chemical and Environmental Engineering, University of Cincinnati,
Cincinnati, 2901 Woodside Drive, Cincinnati, OH 45221, USA.

^e Laboratoire Catalyse et Spectrochimie (LCS), Normandie University, ENSICAEN,
UNICAEN, CNRS, 6 boulevard du Marechal Juin, Caen 14050, France.

* Corresponding authors: Dr. Hailing Guo (Email addresses: guohl@upc.edu.cn)

Table of Contents

I. Experimental Procedures-----	3
II. Supporting Figures-----	5
III. Supporting Tables-----	12
IV. Data Availability-----	19

I. Experimental Procedures

1 NaOH treatment synthesis of EMT-type zeolite

The EMT-type zeolite used in this study was synthesized by subjecting the EMT-pre (0.3 g) to treatment with a 15 w.t.% NaOH solution (11.7 g). Following a stirring period of 30 minutes, the mixture was treated at 35 °C for different durations (0.5 h, 12 h, and 24 h). Finally, the treated mixture underwent high-speed centrifugation (12000 rpm, 15 min) until reaching a pH of 7. The resulting zeolite crystals were then dried using freeze drying for a duration of 36 hours and designate as EMT-0.5h, EMT-12h, and EMT-24h, respectively.

2 *In-situ* hydrothermal preparation of EMT zeolite

One-pot synthesis of EMT zeolite used the same raw materials and synthetic mother solution formula as NaOH treatment synthesis (16.45 Na₂O: 1.0 Al₂O₃: 5.15 SiO₂: 240 H₂O). After aging for 40 min, the synthetic mother solution was treated at 35 °C for a certain time (0.5 h, 12 h, 24 h). Finally, the mixture was washed by high-speed centrifuged (12000 rpm, 15 min) until pH=7. The zeolite crystals were dried with freeze drying for 36 h.

3 Irradiation experiments

Irradiation experiments were performed on GO/20EMT-24h membranes using a ⁶⁰Co γ irradiation source (2000000 curie) provided by the Suzhou CNNC Huadong Radiation Co., Ltd, China. The dose rate was set at 0.56 kGy/h for a total dose of 100 kGy, with an irradiation time of approximately 178.57 hours.

4 Characterizations

The static water contact angles of membranes were detected using drop shape analyzer (KRUSS, DSA100). The surface potential of composite membranes was analyzed by the SurPASS3 streaming potential analyzer (Anton-Paar). The GO/EMT composites used in the above test is the obtained

composite membrane form. In the TGA test, the powder form of GO/EMT composite membranes stripped from the substrate was used in order to exclude the influence of nylon. Thermogravimetric analyses (TGA) was measured using a NETZSCH (STA 449 F5) analyzer from room temperature to 800 °C with a heating rate of 5 °C min⁻¹ under Air.

II. Supporting Figures

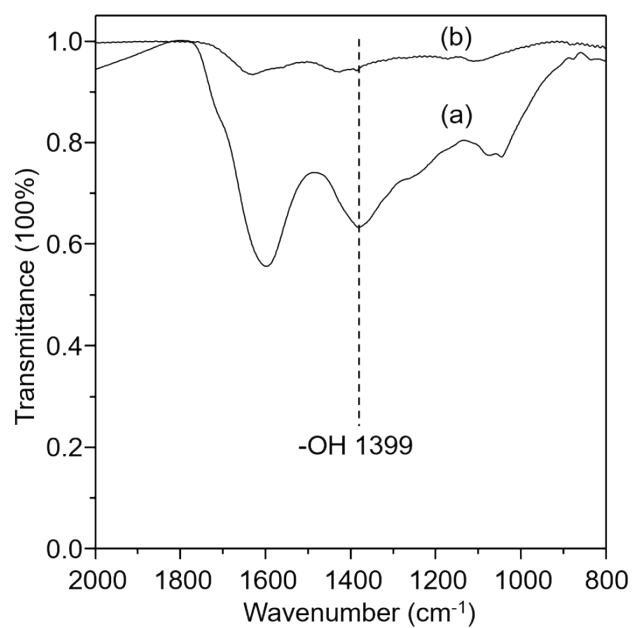


Figure S1. FT-IR spectra of GO treated by (a) NaOH treatment method (15% NaOH), and (b) *in-situ* hydrothermal preparation method (32% NaOH)

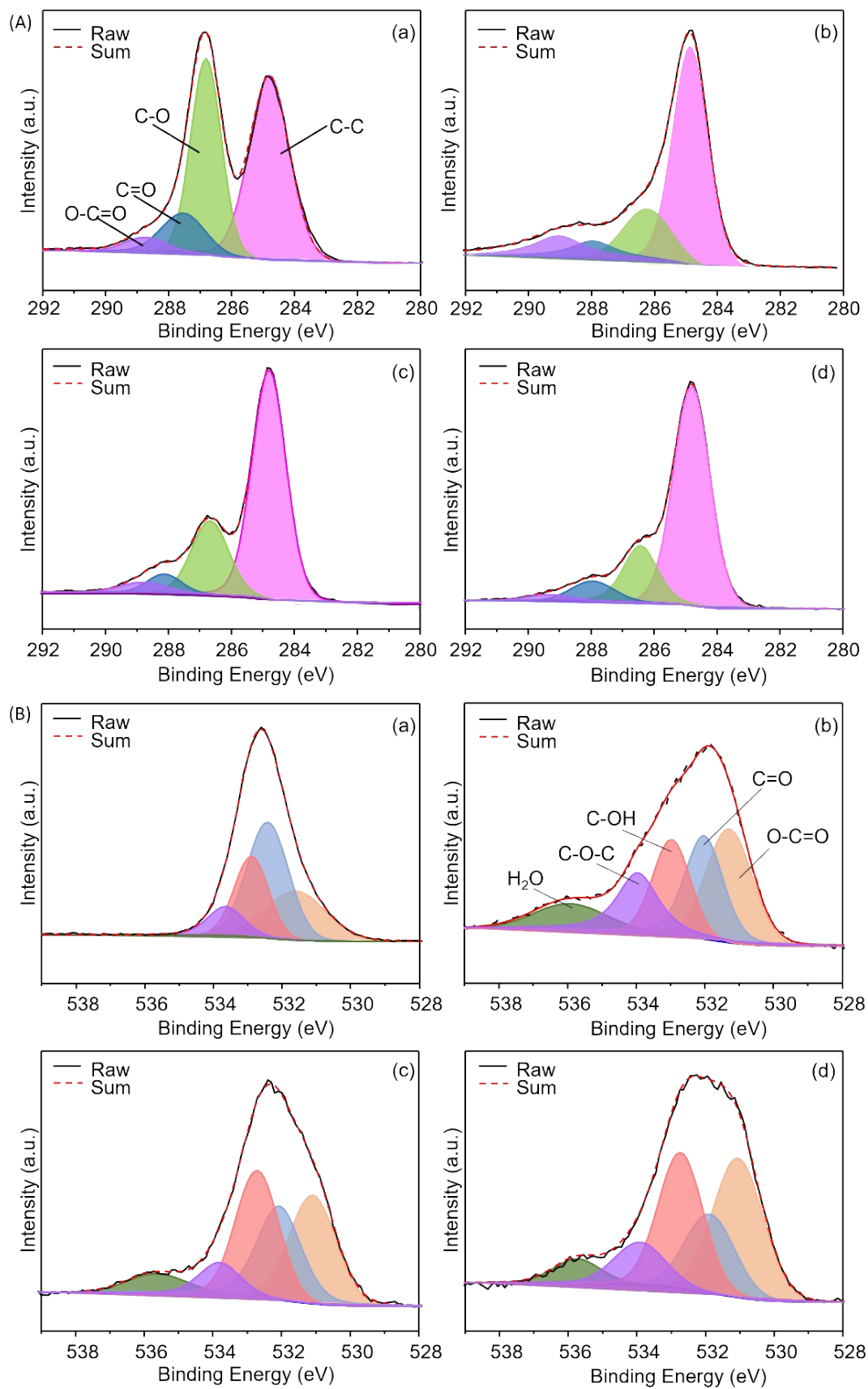


Figure S2. XPS spectra in (A) C 1s and (B) O 1s regions of (a) GO/0EMT-0h, (b) GO/0EMT-0.5h, (c) GO/0EMT-12h, and (d) GO/0EMT-24h

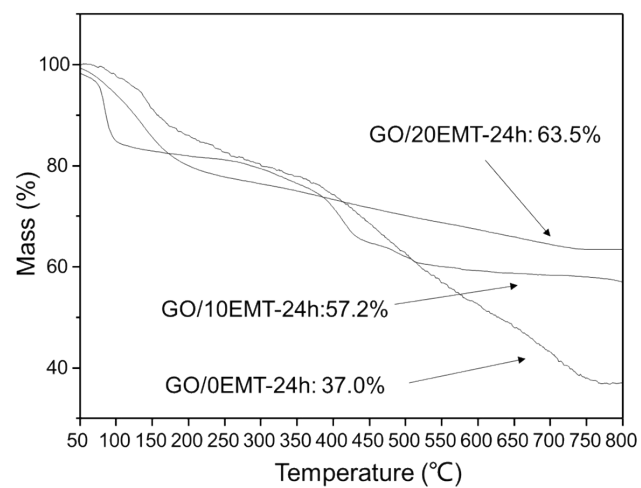


Figure S3. Tg curves of GO/0EMT-24h, GO/10EMT-24h, and GO/20EMT-24h

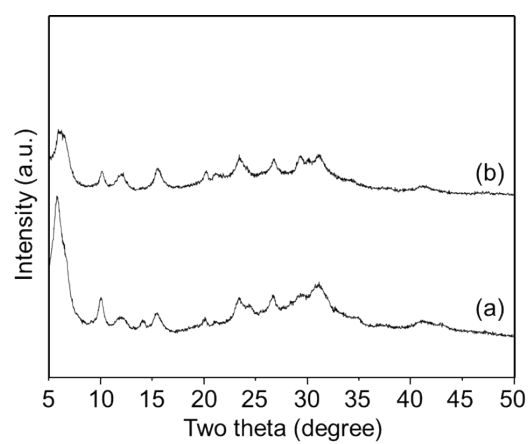


Figure S4. XRD patterns of (a) EMT-24h, and (b) powder sample of GO/10EMT-24h membrane

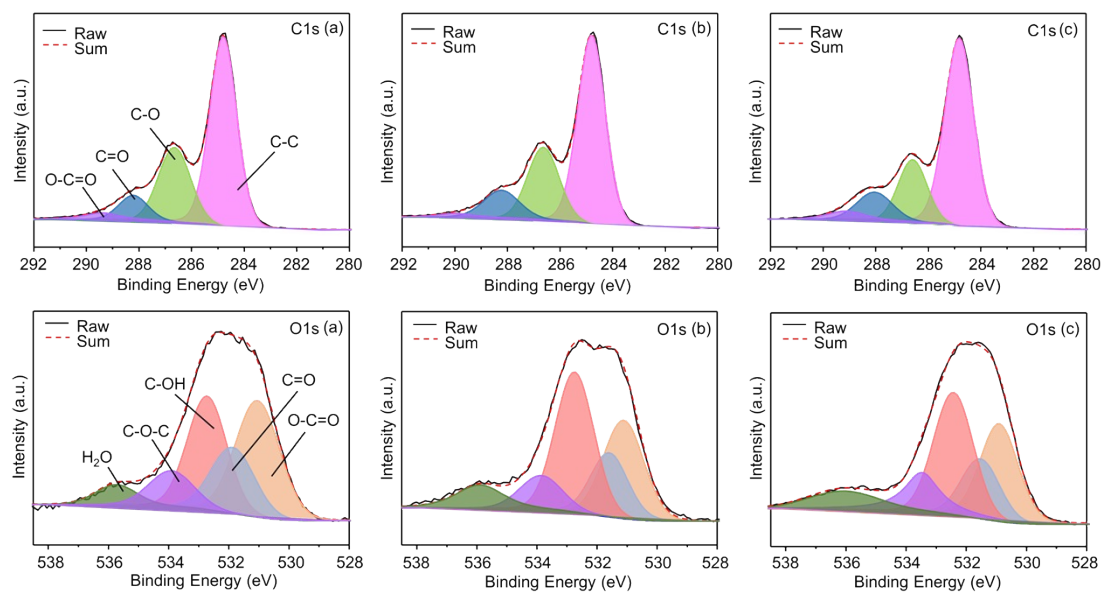


Figure S5. C 1s and O 1s spectra for composite membranes:(a) GO/0EMT-24h, (b) GO/10EMT-24h, and (c) GO/20EMT-24h

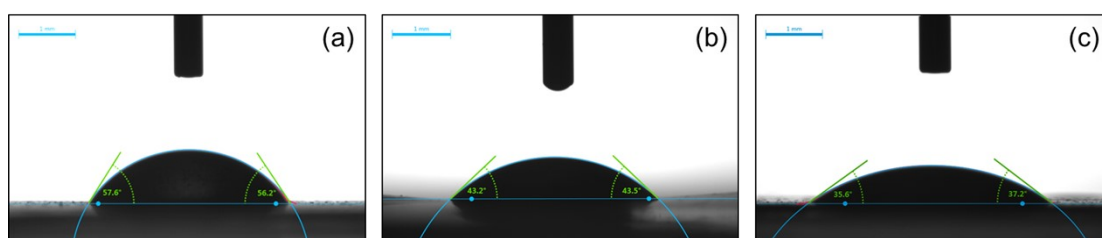


Figure S6. Contact angle images of (a) GO/0EMT-24h, (b) GO/10EMT-24h, and (c) GO/20EMT-24h

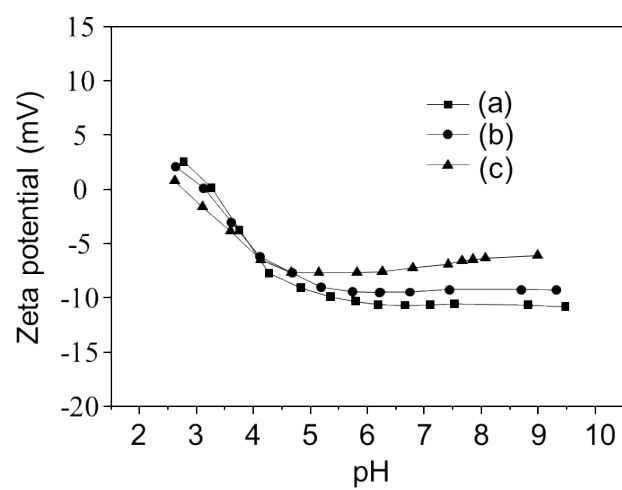


Figure S7. Surface zeta potential of (a) GO/0EMT-24h, (b) GO/10EMT-24h, and (c) GO/20EMT-24h

III. Supporting Tables

Table S1. XPS compositional analysis, fitted parameters, and C/O atomic ratio of the C 1s and O 1s spectra of the GO treated with different times

Samples	Peaks/ Phase	Binding energy (eV)	Peak Area	Relative atomic proportion (%)	C/O
GO/0EMT-0h	(1) C 1s/C-C	284.8	33698.8	49.0	2.13
	(2) C 1s/C-O	286.8	25482.2	37.0	
	(3) C 1s/C=O	287.5	7247.0	10.5	
	(4) C 1s/O-C=O	288.8	2382.3	3.5	
	(5) O 1s/O-C=O	531.6	22333.9	26.3	
	(6) O 1s/C=O	532.4	34751.8	40.9	
	(7) O 1s/C-OH	532.9	19628.8	23.1	
	(8) O 1s/C-O-C	533.6	8342.5	9.7	
	(9) O 1s/H ₂ O	535.7	10.2	/	
GO/0EMT-0.5h	(1) C 1s/C-C	284.8	46141.1	60.9	3.06
	(2) C 1s/C-O	286.2	13837.9	18.3	
	(3) C 1s/C=O	287.9	6458.7	8.5	
	(4) C 1s/O-C=O	289.0	9342.7	12.3	
	(5) O 1s/O-C=O	531.3	18663.9	31.8	
	(6) O 1s/C=O	532.0	15908.7	27.0	
	(7) O 1s/C-OH	533.0	12737.3	21.7	
	(8) O 1s/C-O-C	534.0	11462.5	19.5	
	(9) O 1s/H ₂ O	535.9	6593.8	/	
GO/0EMT-12h	(1) C 1s/C-C	284.8	37952.7	67.9	2.54
	(2) C 1s/C-O	286.7	12873.4	23.0	
	(3) C 1s/C=O	288.1	2971.1	5.3	
	(4) C 1s/O-C=O	288.8	2120.6	3.8	
	(5) O 1s/O-C=O	531.1	16827.1	31.1	
	(6) O 1s/C=O	532.1	15011.3	27.7	
	(7) O 1s/C-OH	532.7	17611.0	32.5	
	(8) O 1s/C-O-C	533.8	4674.3	8.7	
	(9) O 1s/H ₂ O	535.6	3664.1	/	
GO/0EMT-24h	(1) C 1s/C-C	284.8	49679.5	71.3	3.18
	(2) C 1s/C-O	286.4	13133.4	18.9	
	(3) C 1s/C=O	288.0	5186.6	7.4	
	(4) C 1s/O-C=O	289.4	1662.9	2.4	
	(5) O 1s/O-C=O	530.8	19748.3	36.6	
	(6) O 1s/C=O	531.9	10739.5	19.9	
	(7) O 1s/C-OH	532.7	17145.0	31.8	
	(8) O 1s/C-O-C	533.9	6297.3	11.7	
	(9) O 1s/H ₂ O	535.8	3426.9	/	

Table S2. Na⁺ ion concentration in desorption solution of membranes

Membrane	Na ⁺ concentration (mg/L)	Na ⁺ desorption capacity (mg/g)
GO/0EMT-0h	2.1	14.0
GO/0EMT-24h	17.9	119.3
GO/10EMT- 24h	23.1	154.0
GO/20EMT- 24h	27.9	186.0

Table S3 XPS compositional analysis, fitted parameters of the C 1s and O 1s spectra of GO/EMT composite membranes with different loadings

Samples	Peaks/ Phase	Binding energy (EV)	Peak Area	Relative atomic proportion (%)
GO/0EMT-24h	(1) C 1s/C-C	284.8	49679.5	71.3
	(2) C 1s/C-O	286.4	13133.4	18.9
	(3) C 1s/C=O	288.0	5186.6	7.4
	(4) C 1s/O-C=O	289.4	1662.9	2.4
	(5) O 1s/O-C=O	530.8	19748.3	36.6
	(6) O 1s/C=O	531.9	10739.5	19.9
	(7) O 1s/C-OH	532.7	17145.0	31.8
	(8) O 1s/C-O-C	533.9	6297.3	11.7
	(9) O 1s/H ₂ O	535.8	3426.9	/
GO/10EMT-24h	(1) C 1s/C-C	284.8	41854.2	60.4
	(2) C 1s/C-O	286.6	17463.0	25.2
	(3) C 1s/C=O	288.1	8268.0	11.9
	(4) C 1s/O-C=O	290.0	1693.1	2.4
	(5) O 1s/O-C=O	530.8	19689.2	29.3
	(6) O 1s/C=O	531.3	12474.2	18.6
	(7) O 1s/C-OH	532.4	27335.8	40.7
	(8) O 1s/C-O-C	533.5	7606	11.3
	(9) O 1s/H ₂ O	535.6	6934.4	/
GO/20EMT-24h	(10) C 1s/C-C	284.8	50839.3	64.6
	(11) C 1s/C-O	286.6	15711.6	20.0
	(12) C 1s/C=O	288.0	8992.8	11.4
	(13) C 1s/O-C=O	289.1	3136.9	4.0
	(14) O 1s/O-C=O	530.9	20052.3	30.0
	(15) O 1s/C=O	531.5	11705.5	17.5
	(16) O 1s/C-OH	532.4	24541.1	36.8
	(17) O 1s/C-O-C	533.6	10459.6	15.7
	(18) O 1s/H ₂ O	536.0	6720.9	/

Table S4. Contact angle of GO/EMT membranes

Membrane	GO/0EMT-24h	GO/10EMT-24h	GO/20EMT-24h
Contact angle (left) (°)	57.6	43.2	35.6
Contact angle (right) (°)	56.2	43.5	37.2
Average contact angle (°)	56.9	43.4	36.4

Table S5 The nuclide ions adsorption capacity^a and Na⁺ desorption capacity of membranes

	GO/0EMT-0h		GO/0EMT-24h		GO/10EMT-24h		GO/20EMT-24h	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Cs ⁺ (mg/g)	46.0	2.2	154.1	3.3	190.3	4.9	224.4	5.0
Cs ⁺ (mol/g)	/		1.16	0.02	1.43	0.04	1.69	0.04
Desorbed Na ⁺ (mg/g)-during Cs ⁺ adsorption	/		10.2	0.2	11.0	0.2	12.5	0.2
Desorbed Na ⁺ (mol/g)- during Cs ⁺ adsorption	/		0.44	0.02	0.49	0.01	0.54	0.03
Sr ²⁺ (mg/g)	32.2	2.6	223.8	2.7	244.2	3.4	291.8	3.1
Sr ²⁺ (mol/g)	/		2.48	0.03	2.71	0.04	3.24	0.03
Desorbed Na ⁺ (mg/g)- during Sr ²⁺ adsorption	/		12.2	0.2	13.3	0.1	13.7	0.2
Desorbed Na ⁺ (mol/g)- during Sr ²⁺ adsorption	/		0.52	0.02	0.57	0.03	0.58	0.01

^a To clarify whether the enhanced adsorption of GO/EMT composite membranes originates from the EMT phase, both its content and intrinsic adsorption ability were evaluated. TGA results (Figure S3) indicate that the EMT contents in GO/10EMT-24h and GO/20EMT-24h membranes are only 0.2 mg and 1.1 mg, respectively, suggesting a little mass contribution to the total adsorption capacity. Moreover, pure EMT nanocrystals (EMT-24h) synthesized via the same precursor–conversion route exhibited much lower adsorption capacities - 98.0 mg/g for Cs⁺ and 36.2 mg/g for Sr²⁺ - than those of the composite membranes. These findings confirm that the superior adsorption capacity of the GO/EMT membranes arises primarily from the structure of composite membranes, rather than direct ion exchange by EMT.

Table S6 Comparison of the maximum adsorption capacity of Cs⁺ and Sr²⁺ and the required pH value of different adsorbents

Adsorbent	pH	Q_{Cs+} (mg/g)	Q_{Sr2+} (mg/g)	Reference
Magnetic GO	4	9.259	14.706	[1]
Fe ₃ O ₄ /GO	5	15.8	38.4	[2]
KMS-1/r-GO	6	338.18	220.12	[3]
Fe ₃ O ₄ @WO ₃	4.5	44.175	53.178	[4]
KOH-activated biochar	7	62.7	43.0	[5]
PB-alginate aerogel	11	19.88	20.10	[6]
PB nanorods	7	194.26	256.62	[7]
FJSM-SnS/PAN	7.1	296.12	62.88	[8]
GO powder	3	32.53	/	[9]
GO powder	6	95.46	/	[10]
MXene (Ti ₃ C ₂ T _x)	7	148	/	[11]
RGOA/TPBAs	7	226.98	/	[12]
Ozonated GO	12	/	85	[13]
Chitosan-GO	6	/	179.6	[14]
AMPA-GO	2	/	142.39	[15]
GO powder	2	/	122.36	[15]
titanium phosphate (TiP) aerogel	5	/	373.6	[16]
GO/20EMT-24h membrane	4-9	224.4	291.8	This work

**Table S7 Estimated adsorption isotherm model parameters for Cs⁺ and Sr²⁺
adsorption on GO/20EMT-24h membrane**

Absorbate	Isothermal	Parameter	GO/20EMT-24h
Cs ⁺	Langmuir	q_m (mg/g)	261.56±18.21
		K_L (L/mg)	1.96±1.02
		R^2	0.731
		R_{Adj}^2	0.642
	Freundlich	K_L (mg/g)(L/mg) ^{1/n}	159.85±7.34
		$1/n$ (L/g)	0.10±0.01
		R^2	0.979
		R_{Adj}^2	0.972
Sr ²⁺	Langmuir	q_m (mg/g)	243.59±21.65
		K_L (L/mg)	3.03±1.99
		R^2	0.596
		R_{Adj}^2	0.461
	Freundlich	K_L (mg/g)(L/mg) ^{1/n}	162.08±10.97
		$1/n$ (L/g)	0.12±0.02
		R^2	0.927
		R_{Adj}^2	0.902

IV. Data Availability

Evidence of crosslinking: FT-IR spectra of GO/10EMT-24h and GO/20EMT-24h membranes.

GO/10EMT-24h	GO/20EMT-24h
3990.56303 1.00127	3990.56303 1.00211
3988.63429 1.00126	3988.63429 1.00211
3986.70555 1.00129	3986.70555 1.00211
3984.77681 1.00136	3984.77681 1.00211
3982.84807 1.0014	3982.84807 1.002
3980.91933 1.00129	3980.91933 1.00187
3978.99059 1.00114	3978.99059 1.00174
3977.06185 1.00108	3977.06185 1.0016
3975.13311 1.00104	3975.13311 1.00146
3973.20437 1.00098	3973.20437 1.00133
3971.27563 1.00088	3971.27563 1.0012
3969.34689 1.00073	3969.34689 1.00108
3967.41815 1.00066	3967.41815 1.00098
3965.48941 1.00074	3965.48941 1.00089
3963.56067 1.00079	3963.56067 1.0008
3961.63193 1.00069	3961.63193 1.00071
3959.70319 1.00061	3959.70319 1.00063
3957.77445 1.00063	3957.77445 1.00055
3955.84571 1.0007	3955.84571 1.00049
3953.91697 1.00071	3953.91697 1.00043
3951.98823 1.00053	3951.98823 1.00037
3950.05949 1.00014	3950.05949 1.00029
3948.13075 0.9999	3948.13075 1.00021
3946.20201 0.99998	3946.20201 1.00013
3944.27327 1.00003	3944.27327 1.00005
3942.34453 1	3942.34453 0.99998
3940.41579 1.0001	3940.41579 0.99992
3938.48705 1.00025	3938.48705 0.99986
3936.55831 1.0003	3936.55831 0.9998
3934.62957 1.00014	3934.62957 0.99975
3932.70083 0.99993	3932.70083 0.9997
3930.77209 0.99996	3930.77209 0.99967
3928.84335 1.00011	3928.84335 0.99964
3926.91461 1.00005	3926.91461 0.99962
3924.98587 0.99995	3924.98587 0.99958
3923.05713 1.00002	3923.05713 0.99953
3921.12839 0.99999	3921.12839 0.99947
3919.19965 0.99966	3919.19965 0.99941
3917.27091 0.99949	3917.27091 0.99936

3915.34217 0.99986	3915.34217 0.99934
3913.41343 1.00047	3913.41343 0.99934
3911.48469 1.00085	3911.48469 0.99938
3909.55595 1.00083	3909.55595 0.99946
3907.62721 1.00029	3907.62721 0.99955
3905.69847 0.9994	3905.69847 0.99965
3903.76973 0.99865	3903.76973 0.99972
3901.84099 0.9984	3901.84099 0.99975
3899.91225 0.99878	3899.91225 0.99971
3897.98351 0.99962	3897.98351 0.99964
3896.05477 1.0003	3896.05477 0.99954
3894.12603 1.00028	3894.12603 0.99947
3892.19729 0.99994	3892.19729 0.99943
3890.26855 0.9999	3890.26855 0.99943
3888.33981 0.99987	3888.33981 0.99946
3886.41107 0.99957	3886.41107 0.9995
3884.48233 0.99944	3884.48233 0.99954
3882.55359 0.99943	3882.55359 0.99955
3880.62485 0.99937	3880.62485 0.99955
3878.69611 0.99968	3878.69611 0.99953
3876.76737 1.0001	3876.76737 0.99951
3874.83863 0.99996	3874.83863 0.99947
3872.90989 0.99954	3872.90989 0.99944
3870.98115 0.99928	3870.98115 0.99941
3869.05241 0.99937	3869.05241 0.99939
3867.12367 0.99953	3867.12367 0.99939
3865.19493 0.99942	3865.19493 0.99941
3863.26619 0.99941	3863.26619 0.99945
3861.33745 0.99981	3861.33745 0.9995
3859.40871 1.00017	3859.40871 0.99955
3857.47997 0.99986	3857.47997 0.9996
3855.55123 0.99886	3855.55123 0.99963
3853.62249 0.99818	3853.62249 0.99965
3851.69375 0.99869	3851.69375 0.99964
3849.76501 0.99972	3849.76501 0.99961
3847.83627 1.00034	3847.83627 0.99957
3845.90753 1.00035	3845.90753 0.99955
3843.97879 0.99996	3843.97879 0.99954
3842.05005 0.99955	3842.05005 0.99955
3840.12131 0.99941	3840.12131 0.99958
3838.19257 0.99953	3838.19257 0.9996
3836.26383 0.99972	3836.26383 0.99961
3834.33509 0.99985	3834.33509 0.99961
3832.40635 0.99996	3832.40635 0.99961

3830.47761 1	3830.47761 0.99963
3828.54887 0.9999	3828.54887 0.99966
3826.62013 0.99978	3826.62013 0.99971
3824.69139 0.99969	3824.69139 0.99975
3822.76265 0.99936	3822.76265 0.99977
3820.83391 0.9991	3820.83391 0.99978
3818.90517 0.99944	3818.90517 0.99976
3816.97643 0.99991	3816.97643 0.99973
3815.04769 1.00018	3815.04769 0.9997
3813.11895 1.00054	3813.11895 0.99967
3811.19021 1.00079	3811.19021 0.99967
3809.26147 1.00056	3809.26147 0.9997
3807.33273 1.00011	3807.33273 0.99977
3805.40399 0.99988	3805.40399 0.99984
3803.47525 0.99978	3803.47525 0.99991
3801.54651 0.99972	3801.54651 0.99995
3799.61777 0.9997	3799.61777 0.99994
3797.68903 0.99963	3797.68903 0.99989
3795.76029 0.99966	3795.76029 0.99984
3793.83155 0.99997	3793.83155 0.99978
3791.90281 1.0003	3791.90281 0.99976
3789.97407 1.00044	3789.97407 0.99976
3788.04533 1.00033	3788.04533 0.99978
3786.11659 1.00006	3786.11659 0.99983
3784.18785 0.99985	3784.18785 0.99989
3782.25911 0.99972	3782.25911 0.99996
3780.33037 0.99961	3780.33037 1.00003
3778.40163 0.9997	3778.40163 1.00008
3776.47289 0.99996	3776.47289 1.00012
3774.54415 1	3774.54415 1.00015
3772.61541 0.99962	3772.61541 1.00018
3770.68667 0.99912	3770.68667 1.00022
3768.75793 0.99894	3768.75793 1.00029
3766.82919 0.99902	3766.82919 1.00037
3764.90045 0.99909	3764.90045 1.00047
3762.97171 0.99907	3762.97171 1.00057
3761.04297 0.99881	3761.04297 1.00069
3759.11423 0.99852	3759.11423 1.00082
3757.18549 0.99851	3757.18549 1.00096
3755.25675 0.99846	3755.25675 1.00113
3753.32801 0.99796	3753.32801 1.00128
3751.39927 0.99731	3751.39927 1.00141
3749.47053 0.99707	3749.47053 1.00151
3747.54179 0.99693	3747.54179 1.00158

3745.61305 0.99641	3745.61305 1.00164
3743.68431 0.99629	3743.68431 1.00167
3741.75557 0.99695	3741.75557 1.00169
3739.82683 0.99719	3739.82683 1.00169
3737.89809 0.99634	3737.89809 1.00165
3735.96935 0.99539	3735.96935 1.0016
3734.04061 0.99546	3734.04061 1.00153
3732.11187 0.99629	3732.11187 1.00144
3730.18313 0.99687	3730.18313 1.00131
3728.25439 0.9967	3728.25439 1.00115
3726.32565 0.99615	3726.32565 1.00096
3724.39691 0.99581	3724.39691 1.00075
3722.46817 0.99569	3722.46817 1.00057
3720.53943 0.99563	3720.53943 1.00042
3718.61069 0.99556	3718.61069 1.00031
3716.68195 0.99533	3716.68195 1.0002
3714.75321 0.99479	3714.75321 1.00008
3712.82447 0.99392	3712.82447 0.99992
3710.89573 0.99313	3710.89573 0.9997
3708.96699 0.99284	3708.96699 0.99939
3707.03825 0.9928	3707.03825 0.999
3705.10951 0.9924	3705.10951 0.99853
3703.18077 0.9915	3703.18077 0.99798
3701.25203 0.99067	3701.25203 0.9974
3699.32329 0.99016	3699.32329 0.9968
3697.39455 0.98956	3697.39455 0.99618
3695.46581 0.98861	3695.46581 0.99555
3693.53707 0.98739	3693.53707 0.99485
3691.60833 0.98612	3691.60833 0.99407
3689.67959 0.98514	3689.67959 0.99315
3687.75085 0.98447	3687.75085 0.99208
3685.82211 0.98376	3685.82211 0.99084
3683.89337 0.98272	3683.89337 0.98942
3681.96463 0.98124	3681.96463 0.98781
3680.03589 0.97936	3680.03589 0.986
3678.10715 0.97716	3678.10715 0.98395
3676.17841 0.97488	3676.17841 0.98165
3674.24967 0.97296	3674.24967 0.97905
3672.32093 0.97125	3672.32093 0.97612
3670.39219 0.96913	3670.39219 0.97284
3668.46345 0.96882	3668.46345 0.96919
3666.53471 0.96467	3666.53471 0.96517
3664.60597 0.96234	3664.60597 0.96078
3662.67723 0.95951	3662.67723 0.95603

3660.74849 0.95619	3660.74849 0.95095
3658.81975 0.95252	3658.81975 0.94554
3656.89101 0.9487	3656.89101 0.93981
3654.96227 0.9449	3654.96227 0.93374
3653.03353 0.94082	3653.03353 0.92731
3651.10479 0.9362	3651.10479 0.92052
3649.17605 0.93153	3649.17605 0.91337
3647.24731 0.9274	3647.24731 0.90588
3645.31857 0.92372	3645.31857 0.89809
3643.38983 0.91983	3643.38983 0.89006
3641.46109 0.91542	3641.46109 0.88185
3639.53235 0.91074	3639.53235 0.87351
3637.60361 0.90595	3637.60361 0.86509
3635.67487 0.90099	3635.67487 0.85661
3633.74613 0.89588	3633.74613 0.8481
3631.81739 0.89057	3631.81739 0.83957
3629.88865 0.88521	3629.88865 0.83105
3627.95991 0.88041	3627.95991 0.82256
3626.03117 0.87625	3626.03117 0.81414
3624.10243 0.87189	3624.10243 0.80584
3622.17369 0.86699	3622.17369 0.79772
3620.24495 0.86197	3620.24495 0.78979
3618.31621 0.85731	3618.31621 0.78208
3616.38747 0.85301	3616.38747 0.77457
3614.45873 0.84881	3614.45873 0.76723
3612.52999 0.84464	3612.52999 0.76004
3610.60125 0.84045	3610.60125 0.75297
3608.67251 0.83631	3608.67251 0.74601
3606.74377 0.83248	3606.74377 0.73916
3604.81503 0.82886	3604.81503 0.73245
3602.88629 0.82506	3602.88629 0.72588
3600.95755 0.8211	3600.95755 0.71946
3599.02881 0.81718	3599.02881 0.71321
3597.10007 0.81336	3597.10007 0.70711
3595.17133 0.80966	3595.17133 0.70114
3593.24259 0.80607	3593.24259 0.6953
3591.31385 0.8023	3591.31385 0.68955
3589.38511 0.79821	3589.38511 0.6839
3587.45637 0.79437	3587.45637 0.67833
3585.52763 0.79125	3585.52763 0.67284
3583.59889 0.78839	3583.59889 0.66746
3581.67015 0.78522	3581.67015 0.66217
3579.74141 0.78188	3579.74141 0.65701
3577.81267 0.77862	3577.81267 0.65197

3575.88393 0.77546	3575.88393 0.64705
3573.95519 0.7723	3573.95519 0.64225
3572.02645 0.76901	3572.02645 0.63754
3570.09771 0.76546	3570.09771 0.63292
3568.16897 0.76182	3568.16897 0.62835
3566.24023 0.75863	3566.24023 0.62385
3564.31149 0.756	3564.31149 0.6194
3562.38275 0.75336	3562.38275 0.61502
3560.45401 0.7505	3560.45401 0.6107
3558.52527 0.74763	3558.52527 0.60645
3556.59653 0.74478	3556.59653 0.60227
3554.66779 0.74184	3554.66779 0.59817
3552.73905 0.73891	3552.73905 0.59414
3550.81031 0.7361	3550.81031 0.59017
3548.88157 0.73331	3548.88157 0.58625
3546.95283 0.73042	3546.95283 0.58238
3545.02409 0.72767	3545.02409 0.57855
3543.09535 0.72523	3543.09535 0.57476
3541.16661 0.72284	3541.16661 0.57101
3539.23787 0.72022	3539.23787 0.56732
3537.30913 0.71747	3537.30913 0.56368
3535.38039 0.7148	3535.38039 0.56011
3533.45165 0.71228	3533.45165 0.55658
3531.52291 0.70974	3531.52291 0.55311
3529.59417 0.70709	3529.59417 0.54968
3527.66543 0.7045	3527.66543 0.5463
3525.73669 0.70202	3525.73669 0.54295
3523.80795 0.69958	3523.80795 0.53964
3521.87921 0.69723	3521.87921 0.53638
3519.95047 0.69495	3519.95047 0.53315
3518.02173 0.69266	3518.02173 0.52996
3516.09299 0.69034	3516.09299 0.52683
3514.16425 0.68804	3514.16425 0.52375
3512.23551 0.68565	3512.23551 0.52073
3510.30677 0.68325	3510.30677 0.51775
3508.37803 0.68096	3508.37803 0.51482
3506.44929 0.67868	3506.44929 0.51192
3504.52055 0.67637	3504.52055 0.50906
3502.59181 0.67417	3502.59181 0.50624
3500.66307 0.67214	3500.66307 0.50346
3498.73433 0.67012	3498.73433 0.50073
3496.80559 0.668	3496.80559 0.49804
3494.87685 0.6659	3494.87685 0.49541
3492.94811 0.66394	3492.94811 0.49283

3491.01937 0.66203	3491.01937 0.4903
3489.09063 0.66007	3489.09063 0.48782
3487.16189 0.65811	3487.16189 0.48539
3485.23315 0.65617	3485.23315 0.483
3483.30441 0.65428	3483.30441 0.48065
3481.37567 0.65244	3481.37567 0.47834
3479.44693 0.65067	3479.44693 0.47607
3477.51819 0.64896	3477.51819 0.47385
3475.58945 0.64724	3475.58945 0.47167
3473.66071 0.6455	3473.66071 0.46955
3471.73197 0.64378	3471.73197 0.46748
3469.80323 0.64209	3469.80323 0.46546
3467.87449 0.64049	3467.87449 0.46349
3465.94575 0.63903	3465.94575 0.46158
3464.01701 0.63756	3464.01701 0.45971
3462.08827 0.63606	3462.08827 0.4579
3460.15953 0.6346	3460.15953 0.45614
3458.23079 0.63316	3458.23079 0.45443
3456.30205 0.63177	3456.30205 0.45276
3454.37331 0.63045	3454.37331 0.45114
3452.44457 0.62916	3452.44457 0.44959
3450.51583 0.62789	3450.51583 0.44809
3448.58709 0.62658	3448.58709 0.44667
3446.65835 0.62532	3446.65835 0.44531
3444.72961 0.62425	3444.72961 0.44401
3442.80087 0.62329	3442.80087 0.44278
3440.87213 0.62235	3440.87213 0.4416
3438.94339 0.62144	3438.94339 0.44049
3437.01465 0.62054	3437.01465 0.43945
3435.08591 0.61962	3435.08591 0.43847
3433.15717 0.61877	3433.15717 0.43756
3431.22843 0.61799	3431.22843 0.43671
3429.29969 0.61722	3429.29969 0.43593
3427.37095 0.61651	3427.37095 0.43522
3425.44221 0.61586	3425.44221 0.43458
3423.51347 0.61531	3423.51347 0.43402
3421.58473 0.61489	3421.58473 0.43351
3419.65599 0.61449	3419.65599 0.43306
3417.72725 0.61405	3417.72725 0.43266
3415.79851 0.61365	3415.79851 0.4323
3413.86977 0.61337	3413.86977 0.432
3411.94103 0.61314	3411.94103 0.43175
3410.01229 0.61294	3410.01229 0.43155
3408.08355 0.6128	3408.08355 0.4314

3406.15481 0.61271	3406.15481 0.4313
3404.22607 0.6126	3404.22607 0.43125
3402.29733 0.6125	3402.29733 0.43124
3400.36859 0.61249	3400.36859 0.43128
3398.43985 0.6126	3398.43985 0.43137
3396.51111 0.61275	3396.51111 0.43151
3394.58237 0.61291	3394.58237 0.4317
3392.65363 0.61312	3392.65363 0.43193
3390.72489 0.61337	3390.72489 0.43221
3388.79615 0.61362	3388.79615 0.43254
3386.86741 0.61388	3386.86741 0.43293
3384.93867 0.61423	3384.93867 0.43337
3383.00993 0.61464	3383.00993 0.43387
3381.08119 0.6151	3381.08119 0.43441
3379.15245 0.61564	3379.15245 0.43501
3377.22371 0.61625	3377.22371 0.43566
3375.29497 0.61687	3375.29497 0.43636
3373.36623 0.61751	3373.36623 0.43713
3371.43749 0.61819	3371.43749 0.43796
3369.50875 0.61888	3369.50875 0.43885
3367.58001 0.61959	3367.58001 0.43977
3365.65127 0.62038	3365.65127 0.44074
3363.72253 0.62127	3363.72253 0.44173
3361.79379 0.62224	3361.79379 0.44276
3359.86505 0.62322	3359.86505 0.44381
3357.93631 0.62414	3357.93631 0.44489
3356.00757 0.62504	3356.00757 0.44598
3354.07883 0.626	3354.07883 0.44708
3352.15009 0.62706	3352.15009 0.44819
3350.22135 0.62814	3350.22135 0.4493
3348.29261 0.62914	3348.29261 0.45042
3346.36387 0.63013	3346.36387 0.45156
3344.43513 0.63117	3344.43513 0.4527
3342.50639 0.63224	3342.50639 0.45385
3340.57765 0.63328	3340.57765 0.455
3338.64891 0.63432	3338.64891 0.45616
3336.72017 0.63538	3336.72017 0.45733
3334.79143 0.63644	3334.79143 0.45851
3332.86269 0.63752	3332.86269 0.45969
3330.93395 0.63863	3330.93395 0.46086
3329.00521 0.6397	3329.00521 0.46202
3327.07647 0.64074	3327.07647 0.46316
3325.14773 0.64181	3325.14773 0.46429
3323.21899 0.64296	3323.21899 0.46541

3321.29025 0.64415	3321.29025 0.46653
3319.36151 0.64528	3319.36151 0.46762
3317.43277 0.64633	3317.43277 0.46869
3315.50403 0.64735	3315.50403 0.46973
3313.57529 0.64832	3313.57529 0.47075
3311.64655 0.64926	3311.64655 0.47174
3309.71781 0.65026	3309.71781 0.47272
3307.78907 0.6513	3307.78907 0.47369
3305.86033 0.65228	3305.86033 0.47463
3303.93159 0.65318	3303.93159 0.47555
3302.00285 0.65415	3302.00285 0.47645
3300.07411 0.65521	3300.07411 0.47733
3298.14537 0.65619	3298.14537 0.47819
3296.21663 0.65702	3296.21663 0.47903
3294.28789 0.6578	3294.28789 0.47984
3292.35915 0.65863	3292.35915 0.48063
3290.43041 0.65947	3290.43041 0.48139
3288.50167 0.66031	3288.50167 0.48212
3286.57293 0.66115	3286.57293 0.48285
3284.64419 0.66196	3284.64419 0.48356
3282.71545 0.6627	3282.71545 0.48427
3280.78671 0.66345	3280.78671 0.48496
3278.85797 0.66424	3278.85797 0.48564
3276.92923 0.66502	3276.92923 0.4863
3275.00049 0.66576	3275.00049 0.48695
3273.07175 0.66649	3273.07175 0.48759
3271.14301 0.66722	3271.14301 0.48824
3269.21427 0.66795	3269.21427 0.48889
3267.28553 0.66866	3267.28553 0.48953
3265.35679 0.66937	3265.35679 0.49017
3263.42805 0.67011	3263.42805 0.4908
3261.49931 0.6709	3261.49931 0.49143
3259.57057 0.67167	3259.57057 0.49207
3257.64183 0.67244	3257.64183 0.49273
3255.71309 0.67326	3255.71309 0.49339
3253.78435 0.6741	3253.78435 0.49406
3251.85561 0.6749	3251.85561 0.49474
3249.92687 0.67566	3249.92687 0.49544
3247.99813 0.67647	3247.99813 0.49617
3246.06939 0.67737	3246.06939 0.49693
3244.14065 0.67831	3244.14065 0.49771
3242.21191 0.67922	3242.21191 0.49851
3240.28317 0.68008	3240.28317 0.49933
3238.35443 0.68092	3238.35443 0.50016

3236.42569 0.68181	3236.42569 0.50101
3234.49695 0.68277	3234.49695 0.50188
3232.56821 0.68379	3232.56821 0.50277
3230.63947 0.68475	3230.63947 0.50367
3228.71073 0.68568	3228.71073 0.50458
3226.78199 0.68668	3226.78199 0.5055
3224.85325 0.6878	3224.85325 0.50644
3222.92451 0.68897	3222.92451 0.5074
3220.99577 0.69014	3220.99577 0.50839
3219.06703 0.69125	3219.06703 0.5094
3217.13829 0.69231	3217.13829 0.51043
3215.20955 0.69339	3215.20955 0.51148
3213.28081 0.69455	3213.28081 0.51254
3211.35207 0.6958	3211.35207 0.51362
3209.42333 0.69707	3209.42333 0.51472
3207.49459 0.69829	3207.49459 0.51583
3205.56585 0.69945	3205.56585 0.51696
3203.63711 0.70063	3203.63711 0.5181
3201.70837 0.7019	3201.70837 0.51926
3199.77963 0.70316	3199.77963 0.52044
3197.85089 0.70434	3197.85089 0.52164
3195.92215 0.70551	3195.92215 0.52286
3193.99341 0.70681	3193.99341 0.52411
3192.06467 0.70825	3192.06467 0.52537
3190.13593 0.70968	3190.13593 0.52663
3188.20719 0.71096	3188.20719 0.5279
3186.27845 0.71216	3186.27845 0.52918
3184.34971 0.71343	3184.34971 0.53047
3182.42097 0.71478	3182.42097 0.53177
3180.49223 0.71616	3180.49223 0.53307
3178.56349 0.7175	3178.56349 0.53438
3176.63475 0.71876	3176.63475 0.53568
3174.70601 0.72001	3174.70601 0.53699
3172.77727 0.72137	3172.77727 0.5383
3170.84853 0.72281	3170.84853 0.53963
3168.91979 0.72419	3168.91979 0.54097
3166.99105 0.72551	3166.99105 0.54232
3165.06231 0.72679	3165.06231 0.54368
3163.13357 0.72802	3163.13357 0.54504
3161.20483 0.72931	3161.20483 0.54641
3159.27609 0.73074	3159.27609 0.54778
3157.34735 0.73217	3157.34735 0.54915
3155.41861 0.7335	3155.41861 0.55051
3153.48987 0.73474	3153.48987 0.55187

3151.56113 0.73603	3151.56113 0.55322
3149.63239 0.73741	3149.63239 0.55457
3147.70365 0.7388	3147.70365 0.55593
3145.77491 0.74009	3145.77491 0.5573
3143.84617 0.74128	3143.84617 0.55869
3141.91743 0.74247	3141.91743 0.56009
3139.98869 0.74373	3139.98869 0.56149
3138.05995 0.74505	3138.05995 0.56288
3136.13121 0.74637	3136.13121 0.56428
3134.20247 0.74764	3134.20247 0.56567
3132.27373 0.74884	3132.27373 0.56705
3130.34499 0.75006	3130.34499 0.56843
3128.41625 0.75136	3128.41625 0.5698
3126.48751 0.75267	3126.48751 0.57117
3124.55877 0.75388	3124.55877 0.57254
3122.63003 0.75506	3122.63003 0.57392
3120.70129 0.75628	3120.70129 0.57531
3118.77255 0.75752	3118.77255 0.5767
3116.84381 0.75878	3116.84381 0.57811
3114.91507 0.76004	3114.91507 0.57951
3112.98633 0.76123	3112.98633 0.58091
3111.05759 0.76235	3111.05759 0.58231
3109.12885 0.7635	3109.12885 0.58372
3107.20011 0.7647	3107.20011 0.58512
3105.27137 0.76591	3105.27137 0.58653
3103.34263 0.76713	3103.34263 0.58794
3101.41389 0.76839	3101.41389 0.58935
3099.48515 0.76964	3099.48515 0.59077
3097.55641 0.77081	3097.55641 0.59219
3095.62767 0.77195	3095.62767 0.59361
3093.69893 0.77314	3093.69893 0.59503
3091.77019 0.77435	3091.77019 0.59644
3089.84145 0.77553	3089.84145 0.59785
3087.91271 0.77668	3087.91271 0.59925
3085.98397 0.77785	3085.98397 0.60065
3084.05523 0.779	3084.05523 0.60205
3082.12649 0.78008	3082.12649 0.60344
3080.19775 0.78112	3080.19775 0.60483
3078.26901 0.7822	3078.26901 0.60622
3076.34027 0.78332	3076.34027 0.60761
3074.41153 0.78442	3074.41153 0.60899
3072.48279 0.78547	3072.48279 0.61038
3070.55405 0.78657	3070.55405 0.61177
3068.62531 0.7877	3068.62531 0.61316

3066.69657 0.7888	3066.69657 0.61455
3064.76783 0.78987	3064.76783 0.61594
3062.83909 0.79092	3062.83909 0.61732
3060.91035 0.79191	3060.91035 0.61869
3058.98161 0.79287	3058.98161 0.62006
3057.05287 0.7939	3057.05287 0.62141
3055.12413 0.79502	3055.12413 0.62275
3053.19539 0.79607	3053.19539 0.62409
3051.26665 0.79697	3051.26665 0.62542
3049.33791 0.79779	3049.33791 0.62676
3047.40917 0.7987	3047.40917 0.6281
3045.48043 0.79978	3045.48043 0.62944
3043.55169 0.80092	3043.55169 0.63078
3041.62295 0.80192	3041.62295 0.63212
3039.69421 0.80272	3039.69421 0.63345
3037.76547 0.80352	3037.76547 0.63478
3035.83673 0.80443	3035.83673 0.63609
3033.90799 0.80537	3033.90799 0.6374
3031.97925 0.80623	3031.97925 0.63869
3030.05051 0.80706	3030.05051 0.63996
3028.12177 0.80786	3028.12177 0.64122
3026.19303 0.80862	3026.19303 0.64246
3024.26429 0.80944	3024.26429 0.6437
3022.33555 0.81036	3022.33555 0.64492
3020.40681 0.81121	3020.40681 0.64612
3018.47807 0.8119	3018.47807 0.6473
3016.54933 0.81244	3016.54933 0.64847
3014.62059 0.81299	3014.62059 0.64962
3012.69185 0.81362	3012.69185 0.65075
3010.76311 0.81421	3010.76311 0.65185
3008.83437 0.81466	3008.83437 0.65291
3006.90563 0.81496	3006.90563 0.65392
3004.97689 0.81523	3004.97689 0.65486
3003.04815 0.8155	3003.04815 0.65573
3001.11941 0.81567	3001.11941 0.65649
2999.19067 0.81556	2999.19067 0.65711
2997.26193 0.81511	2997.26193 0.65756
2995.33319 0.81434	2995.33319 0.65778
2993.40445 0.81326	2993.40445 0.65769
2991.47571 0.81177	2991.47571 0.65724
2989.54697 0.80969	2989.54697 0.65637
2987.61823 0.80685	2987.61823 0.65506
2985.68949 0.80323	2985.68949 0.65332
2983.76075 0.79894	2983.76075 0.65127

2981.83201 0.79429	2981.83201 0.64904
2979.90327 0.78975	2979.90327 0.64685
2977.97453 0.78589	2977.97453 0.64494
2976.04579 0.78332	2976.04579 0.64356
2974.11705 0.78246	2974.11705 0.64287
2972.18831 0.78352	2972.18831 0.643
2970.25957 0.78631	2970.25957 0.64394
2968.33083 0.79021	2968.33083 0.64563
2966.40209 0.79451	2966.40209 0.64793
2964.47335 0.79871	2964.47335 0.65065
2962.54461 0.80263	2962.54461 0.65361
2960.61587 0.80625	2960.61587 0.65662
2958.68713 0.80945	2958.68713 0.65952
2956.75839 0.81211	2956.75839 0.66221
2954.82965 0.81422	2954.82965 0.66461
2952.90091 0.8158	2952.90091 0.66667
2950.97217 0.8169	2950.97217 0.66837
2949.04343 0.81762	2949.04343 0.66969
2947.11469 0.818	2947.11469 0.67063
2945.18595 0.81798	2945.18595 0.6712
2943.25721 0.81753	2943.25721 0.67142
2941.32847 0.81673	2941.32847 0.67132
2939.39973 0.81577	2939.39973 0.67094
2937.47099 0.81474	2937.47099 0.67033
2935.54225 0.81365	2935.54225 0.66956
2933.61351 0.81246	2933.61351 0.66869
2931.68477 0.81121	2931.68477 0.66782
2929.75603 0.81003	2929.75603 0.66708
2927.82729 0.80919	2927.82729 0.66661
2925.89855 0.80883	2925.89855 0.66655
2923.96981 0.80892	2923.96981 0.66701
2922.04107 0.80945	2922.04107 0.66805
2920.11233 0.81045	2920.11233 0.66965
2918.18359 0.81194	2918.18359 0.67171
2916.25485 0.81377	2916.25485 0.67408
2914.32611 0.81566	2914.32611 0.67658
2912.39737 0.81732	2912.39737 0.67901
2910.46863 0.81856	2910.46863 0.68121
2908.53989 0.8193	2908.53989 0.68307
2906.61115 0.81967	2906.61115 0.68458
2904.68241 0.81976	2904.68241 0.68576
2902.75367 0.81969	2902.75367 0.68671
2900.82493 0.81967	2900.82493 0.68755
2898.89619 0.81985	2898.89619 0.68841

2896.96745 0.82025	2896.96745 0.68934
2895.03871 0.82081	2895.03871 0.69039
2893.10997 0.8215	2893.10997 0.69156
2891.18123 0.82227	2891.18123 0.69282
2889.25249 0.82306	2889.25249 0.69412
2887.32375 0.82383	2887.32375 0.69543
2885.39501 0.82459	2885.39501 0.6967
2883.46627 0.82533	2883.46627 0.69788
2881.53753 0.82595	2881.53753 0.69898
2879.60879 0.82653	2879.60879 0.7
2877.68005 0.82718	2877.68005 0.70096
2875.75131 0.82791	2875.75131 0.70191
2873.82257 0.82873	2873.82257 0.70287
2871.89383 0.82967	2871.89383 0.70385
2869.96509 0.83076	2869.96509 0.70482
2868.03635 0.83198	2868.03635 0.70574
2866.10761 0.83316	2866.10761 0.70655
2864.17887 0.83414	2864.17887 0.70719
2862.25014 0.83483	2862.25014 0.70764
2860.3214 0.83523	2860.3214 0.70795
2858.39266 0.83545	2858.39266 0.7082
2856.46392 0.83561	2856.46392 0.70854
2854.53518 0.8358	2854.53518 0.70911
2852.60644 0.83615	2852.60644 0.71006
2850.6777 0.83698	2850.6777 0.71144
2848.74896 0.83848	2848.74896 0.71326
2846.82022 0.84051	2846.82022 0.71542
2844.89148 0.84262	2844.89148 0.71778
2842.96274 0.84444	2842.96274 0.72018
2841.034 0.84591	2841.034 0.72246
2839.10526 0.84717	2839.10526 0.72453
2837.17652 0.84828	2837.17652 0.72634
2835.24778 0.84925	2835.24778 0.72789
2833.31904 0.8501	2833.31904 0.72925
2831.3903 0.85087	2831.3903 0.73046
2829.46156 0.85161	2829.46156 0.73158
2827.53282 0.85235	2827.53282 0.73264
2825.60408 0.8531	2825.60408 0.73366
2823.67534 0.85374	2823.67534 0.73466
2821.7466 0.85425	2821.7466 0.73564
2819.81786 0.85473	2819.81786 0.7366
2817.88912 0.85526	2817.88912 0.73753
2815.96038 0.85584	2815.96038 0.73845
2814.03164 0.85641	2814.03164 0.73935

2812.1029	0.8569	2812.1029	0.74025
2810.17416	0.85735	2810.17416	0.74115
2808.24542	0.85789	2808.24542	0.74205
2806.31668	0.85852	2806.31668	0.74295
2804.38794	0.85917	2804.38794	0.74386
2802.4592	0.85973	2802.4592	0.74477
2800.53046	0.86021	2800.53046	0.74569
2798.60172	0.86069	2798.60172	0.7466
2796.67298	0.86125	2796.67298	0.74753
2794.74424	0.86188	2794.74424	0.74844
2792.8155	0.86248	2792.8155	0.74934
2790.88676	0.86293	2790.88676	0.75022
2788.95802	0.86333	2788.95802	0.75109
2787.02928	0.86378	2787.02928	0.75194
2785.10054	0.86428	2785.10054	0.75278
2783.1718	0.86477	2783.1718	0.75362
2781.24306	0.86516	2781.24306	0.75444
2779.31432	0.86548	2779.31432	0.75525
2777.38558	0.86585	2777.38558	0.75604
2775.45684	0.86627	2775.45684	0.75682
2773.5281	0.8667	2773.5281	0.75759
2771.59936	0.86708	2771.59936	0.75836
2769.67062	0.86739	2769.67062	0.75913
2767.74188	0.86766	2767.74188	0.75988
2765.81314	0.86798	2765.81314	0.76063
2763.8844	0.86839	2763.8844	0.76136
2761.95566	0.8688	2761.95566	0.76208
2760.02692	0.86911	2760.02692	0.7628
2758.09818	0.86935	2758.09818	0.76352
2756.16944	0.8696	2756.16944	0.76423
2754.2407	0.86996	2754.2407	0.76493
2752.31196	0.87037	2752.31196	0.76563
2750.38322	0.87066	2750.38322	0.76631
2748.45448	0.8708	2748.45448	0.767
2746.52574	0.87097	2746.52574	0.76769
2744.597	0.87136	2744.597	0.76839
2742.66826	0.87187	2742.66826	0.7691
2740.73952	0.87229	2740.73952	0.7698
2738.81078	0.87254	2738.81078	0.7705
2736.88204	0.87272	2736.88204	0.7712
2734.9533	0.87297	2734.9533	0.77189
2733.02456	0.87335	2733.02456	0.77259
2731.09582	0.87377	2731.09582	0.77329
2729.16708	0.87409	2729.16708	0.77399

2727.23834 0.87429	2727.23834 0.77468
2725.3096 0.8745	2725.3096 0.77538
2723.38086 0.87488	2723.38086 0.77609
2721.45212 0.87539	2721.45212 0.7768
2719.52338 0.87584	2719.52338 0.77753
2717.59464 0.8762	2717.59464 0.77826
2715.6659 0.87649	2715.6659 0.77898
2713.73716 0.87677	2713.73716 0.7797
2711.80842 0.8771	2711.80842 0.7804
2709.87968 0.8775	2709.87968 0.78109
2707.95094 0.87788	2707.95094 0.78177
2706.0222 0.87818	2706.0222 0.78245
2704.09346 0.87844	2704.09346 0.78312
2702.16472 0.87878	2702.16472 0.7838
2700.23598 0.87922	2700.23598 0.78446
2698.30724 0.87964	2698.30724 0.78513
2696.3785 0.87996	2696.3785 0.7858
2694.44976 0.88019	2694.44976 0.78648
2692.52102 0.88043	2692.52102 0.78715
2690.59228 0.88075	2690.59228 0.78782
2688.66354 0.88114	2688.66354 0.78849
2686.7348 0.88152	2686.7348 0.78914
2684.80606 0.88183	2684.80606 0.78979
2682.87732 0.88208	2682.87732 0.79043
2680.94858 0.88233	2680.94858 0.79107
2679.01984 0.88261	2679.01984 0.7917
2677.0911 0.88294	2677.0911 0.79232
2675.16236 0.88329	2675.16236 0.79292
2673.23362 0.88359	2673.23362 0.7935
2671.30488 0.88382	2671.30488 0.79408
2669.37614 0.88405	2669.37614 0.79465
2667.4474 0.8843	2667.4474 0.79522
2665.51866 0.88458	2665.51866 0.79579
2663.58992 0.88484	2663.58992 0.79635
2661.66118 0.88506	2661.66118 0.79691
2659.73244 0.88523	2659.73244 0.79746
2657.8037 0.88545	2657.8037 0.798
2655.87496 0.88573	2655.87496 0.79855
2653.94622 0.88603	2653.94622 0.79909
2652.01748 0.88624	2652.01748 0.79963
2650.08874 0.88639	2650.08874 0.80016
2648.16 0.88656	2648.16 0.80068
2646.23126 0.88679	2646.23126 0.8012
2644.30252 0.88706	2644.30252 0.80172

2642.37378 0.88735	2642.37378 0.80224
2640.44504 0.88761	2640.44504 0.80276
2638.5163 0.8878	2638.5163 0.80328
2636.58756 0.88794	2636.58756 0.80379
2634.65882 0.88812	2634.65882 0.80429
2632.73008 0.88839	2632.73008 0.80479
2630.80134 0.88865	2630.80134 0.80529
2628.8726 0.88883	2628.8726 0.80579
2626.94386 0.88899	2626.94386 0.80629
2625.01512 0.88924	2625.01512 0.80678
2623.08638 0.88957	2623.08638 0.80727
2621.15764 0.88987	2621.15764 0.80775
2619.2289 0.8901	2619.2289 0.80824
2617.30016 0.89031	2617.30016 0.80874
2615.37142 0.89051	2615.37142 0.80924
2613.44268 0.89072	2613.44268 0.80974
2611.51394 0.89096	2611.51394 0.81023
2609.5852 0.89119	2609.5852 0.81072
2607.65646 0.8914	2607.65646 0.81121
2605.72772 0.89164	2605.72772 0.81171
2603.79898 0.8919	2603.79898 0.81221
2601.87024 0.89218	2601.87024 0.81272
2599.9415 0.89244	2599.9415 0.81323
2598.01276 0.8927	2598.01276 0.81373
2596.08402 0.89295	2596.08402 0.81422
2594.15528 0.8932	2594.15528 0.81471
2592.22654 0.8935	2592.22654 0.81521
2590.2978 0.89381	2590.2978 0.81571
2588.36906 0.89407	2588.36906 0.81621
2586.44032 0.89427	2586.44032 0.81672
2584.51158 0.8945	2584.51158 0.81722
2582.58284 0.89477	2582.58284 0.81771
2580.6541 0.89504	2580.6541 0.81822
2578.72536 0.89529	2578.72536 0.81872
2576.79662 0.89555	2576.79662 0.81923
2574.86788 0.89581	2574.86788 0.81974
2572.93914 0.89604	2572.93914 0.82023
2571.0104 0.89625	2571.0104 0.82072
2569.08166 0.89645	2569.08166 0.82119
2567.15292 0.8967	2567.15292 0.82168
2565.22418 0.89699	2565.22418 0.82217
2563.29544 0.89724	2563.29544 0.82265
2561.3667 0.89747	2561.3667 0.82313
2559.43796 0.89771	2559.43796 0.82359

2557.50922 0.89796	2557.50922 0.82404
2555.58048 0.89821	2555.58048 0.82449
2553.65174 0.89844	2553.65174 0.82494
2551.723 0.89863	2551.723 0.82539
2549.79426 0.89884	2549.79426 0.82585
2547.86552 0.89908	2547.86552 0.82629
2545.93678 0.89931	2545.93678 0.82672
2544.00804 0.89952	2544.00804 0.82716
2542.0793 0.89974	2542.0793 0.8276
2540.15056 0.89996	2540.15056 0.82805
2538.22182 0.9002	2538.22182 0.8285
2536.29308 0.90049	2536.29308 0.82895
2534.36434 0.90081	2534.36434 0.82939
2532.4356 0.9011	2532.4356 0.82983
2530.50686 0.90132	2530.50686 0.83026
2528.57812 0.90154	2528.57812 0.8307
2526.64938 0.90183	2526.64938 0.83114
2524.72064 0.90217	2524.72064 0.83159
2522.7919 0.90247	2522.7919 0.83202
2520.86316 0.90269	2520.86316 0.83245
2518.93442 0.90289	2518.93442 0.83287
2517.00568 0.90312	2517.00568 0.83328
2515.07694 0.90339	2515.07694 0.83371
2513.1482 0.90368	2513.1482 0.83415
2511.21946 0.90396	2511.21946 0.83458
2509.29072 0.90421	2509.29072 0.83502
2507.36198 0.90446	2507.36198 0.83545
2505.43324 0.90475	2505.43324 0.83588
2503.5045 0.90507	2503.5045 0.83634
2501.57576 0.90532	2501.57576 0.83681
2499.64702 0.90551	2499.64702 0.83729
2497.71828 0.90574	2497.71828 0.83777
2495.78954 0.90605	2495.78954 0.83824
2493.8608 0.90639	2493.8608 0.83869
2491.93206 0.90669	2491.93206 0.83914
2490.00332 0.90696	2490.00332 0.83959
2488.07458 0.90723	2488.07458 0.84003
2486.14584 0.90756	2486.14584 0.84046
2484.2171 0.90793	2484.2171 0.84087
2482.28836 0.90825	2482.28836 0.84125
2480.35962 0.90849	2480.35962 0.84162
2478.43088 0.9087	2478.43088 0.84199
2476.50214 0.90896	2476.50214 0.84238
2474.5734 0.9093	2474.5734 0.84279

2472.64466 0.90967	2472.64466 0.84323
2470.71592 0.90998	2470.71592 0.84371
2468.78718 0.91023	2468.78718 0.84423
2466.85844 0.91052	2466.85844 0.84481
2464.9297 0.91088	2464.9297 0.84545
2463.00096 0.91126	2463.00096 0.84615
2461.07222 0.91161	2461.07222 0.84688
2459.14348 0.9119	2459.14348 0.84761
2457.21474 0.91219	2457.21474 0.84833
2455.286 0.91252	2455.286 0.84902
2453.35726 0.91286	2453.35726 0.84968
2451.42852 0.91316	2451.42852 0.8503
2449.49978 0.91345	2449.49978 0.8509
2447.57104 0.91375	2447.57104 0.85147
2445.6423 0.91409	2445.6423 0.852
2443.71356 0.91441	2443.71356 0.8525
2441.78482 0.9147	2441.78482 0.85298
2439.85608 0.91494	2439.85608 0.85347
2437.92734 0.91518	2437.92734 0.85395
2435.9986 0.91547	2435.9986 0.85443
2434.06986 0.91577	2434.06986 0.8549
2432.14112 0.91605	2432.14112 0.85536
2430.21238 0.91629	2430.21238 0.8558
2428.28364 0.9165	2428.28364 0.85624
2426.3549 0.91671	2426.3549 0.85669
2424.42616 0.91699	2424.42616 0.85714
2422.49742 0.91732	2422.49742 0.8576
2420.56868 0.91761	2420.56868 0.85804
2418.63994 0.91783	2418.63994 0.85847
2416.7112 0.91805	2416.7112 0.8589
2414.78246 0.91835	2414.78246 0.85934
2412.85372 0.91871	2412.85372 0.85979
2410.92498 0.91903	2410.92498 0.86024
2408.99624 0.91926	2408.99624 0.8607
2407.0675 0.91947	2407.0675 0.86115
2405.13876 0.91976	2405.13876 0.86159
2403.21002 0.92014	2403.21002 0.86204
2401.28128 0.92047	2401.28128 0.8625
2399.35254 0.92071	2399.35254 0.86297
2397.4238 0.92093	2397.4238 0.86344
2395.49506 0.92121	2395.49506 0.8639
2393.56632 0.92156	2393.56632 0.86436
2391.63758 0.9219	2391.63758 0.8648
2389.70884 0.92218	2389.70884 0.86525

2387.7801	0.92243	2387.7801	0.8657
2385.85136	0.9227	2385.85136	0.86616
2383.92262	0.92302	2383.92262	0.86662
2381.99388	0.92335	2381.99388	0.86707
2380.06514	0.92359	2380.06514	0.86752
2378.1364	0.92373	2378.1364	0.86798
2376.20766	0.92382	2376.20766	0.86845
2374.27892	0.92393	2374.27892	0.86892
2372.35018	0.92406	2372.35018	0.8694
2370.42144	0.92418	2370.42144	0.86987
2368.4927	0.92427	2368.4927	0.87033
2366.56396	0.92438	2366.56396	0.87076
2364.63522	0.92454	2364.63522	0.87118
2362.70648	0.92478	2362.70648	0.87159
2360.77774	0.92509	2360.77774	0.87199
2358.849	0.92541	2358.849	0.87237
2356.92026	0.92575	2356.92026	0.87274
2354.99152	0.92613	2354.99152	0.8731
2353.06278	0.92659	2353.06278	0.87345
2351.13404	0.92707	2351.13404	0.87381
2349.2053	0.92744	2349.2053	0.87419
2347.27656	0.9276	2347.27656	0.87459
2345.34782	0.92765	2345.34782	0.87499
2343.41908	0.92771	2343.41908	0.8754
2341.49034	0.92787	2341.49034	0.8758
2339.5616	0.92814	2339.5616	0.8762
2337.63286	0.92841	2337.63286	0.8766
2335.70412	0.9286	2335.70412	0.877
2333.77538	0.92879	2333.77538	0.87739
2331.84664	0.92907	2331.84664	0.87776
2329.9179	0.92941	2329.9179	0.87812
2327.98916	0.92974	2327.98916	0.87845
2326.06042	0.93003	2326.06042	0.87879
2324.13168	0.93031	2324.13168	0.87912
2322.20294	0.9306	2322.20294	0.87946
2320.2742	0.93091	2320.2742	0.8798
2318.34546	0.93122	2318.34546	0.88014
2316.41672	0.9315	2316.41672	0.88046
2314.48798	0.93175	2314.48798	0.88078
2312.55924	0.93198	2312.55924	0.88109
2310.6305	0.93223	2310.6305	0.8814
2308.70176	0.93247	2308.70176	0.88171
2306.77302	0.93271	2306.77302	0.88201
2304.84428	0.93295	2304.84428	0.88231

2302.91554 0.9332	2302.91554 0.8826
2300.9868 0.93343	2300.9868 0.8829
2299.05806 0.93366	2299.05806 0.88319
2297.12932 0.93388	2297.12932 0.8835
2295.20058 0.93405	2295.20058 0.8838
2293.27184 0.93418	2293.27184 0.8841
2291.3431 0.93431	2291.3431 0.88438
2289.41436 0.93443	2289.41436 0.88466
2287.48562 0.93458	2287.48562 0.88493
2285.55688 0.93476	2285.55688 0.88521
2283.62814 0.93495	2283.62814 0.88549
2281.6994 0.93512	2281.6994 0.88576
2279.77066 0.93527	2279.77066 0.88603
2277.84192 0.93542	2277.84192 0.88629
2275.91318 0.93557	2275.91318 0.88655
2273.98444 0.93572	2273.98444 0.8868
2272.0557 0.93587	2272.0557 0.88705
2270.12696 0.93602	2270.12696 0.8873
2268.19822 0.93614	2268.19822 0.88754
2266.26948 0.93622	2266.26948 0.88777
2264.34074 0.93633	2264.34074 0.88799
2262.412 0.93649	2262.412 0.88822
2260.48326 0.93665	2260.48326 0.88845
2258.55452 0.93676	2258.55452 0.88869
2256.62578 0.93684	2256.62578 0.88894
2254.69704 0.93693	2254.69704 0.8892
2252.7683 0.93709	2252.7683 0.88946
2250.83956 0.93733	2250.83956 0.88973
2248.91082 0.93756	2248.91082 0.89001
2246.98208 0.93773	2246.98208 0.8903
2245.05334 0.93789	2245.05334 0.89059
2243.1246 0.93806	2243.1246 0.89088
2241.19586 0.93823	2241.19586 0.89116
2239.26712 0.93843	2239.26712 0.89144
2237.33838 0.93865	2237.33838 0.89171
2235.40964 0.93881	2235.40964 0.89197
2233.4809 0.93891	2233.4809 0.89224
2231.55216 0.93902	2231.55216 0.89251
2229.62342 0.93921	2229.62342 0.89277
2227.69468 0.9394	2227.69468 0.89303
2225.76594 0.93951	2225.76594 0.89329
2223.8372 0.93955	2223.8372 0.89354
2221.90846 0.93965	2221.90846 0.8938
2219.97972 0.93985	2219.97972 0.89407

2218.05098 0.94008	2218.05098 0.89434
2216.12224 0.94025	2216.12224 0.89462
2214.1935 0.94034	2214.1935 0.8949
2212.26476 0.94043	2212.26476 0.89518
2210.33602 0.94059	2210.33602 0.89546
2208.40728 0.94078	2208.40728 0.89574
2206.47854 0.94094	2206.47854 0.89602
2204.5498 0.94108	2204.5498 0.8963
2202.62106 0.94119	2202.62106 0.89657
2200.69232 0.94131	2200.69232 0.89684
2198.76358 0.9415	2198.76358 0.89711
2196.83484 0.9417	2196.83484 0.89739
2194.9061 0.94183	2194.9061 0.89767
2192.97736 0.94195	2192.97736 0.89796
2191.04862 0.94212	2191.04862 0.89827
2189.11988 0.94233	2189.11988 0.89857
2187.19114 0.94255	2187.19114 0.89888
2185.2624 0.94275	2185.2624 0.89919
2183.33366 0.94293	2183.33366 0.89951
2181.40492 0.94307	2181.40492 0.89983
2179.47618 0.9432	2179.47618 0.90016
2177.54744 0.94333	2177.54744 0.90049
2175.6187 0.94348	2175.6187 0.90083
2173.68996 0.94362	2173.68996 0.90118
2171.76122 0.94378	2171.76122 0.90153
2169.83248 0.944	2169.83248 0.90189
2167.90374 0.94423	2167.90374 0.90225
2165.975 0.94445	2165.975 0.90263
2164.04626 0.94466	2164.04626 0.903
2162.11752 0.94484	2162.11752 0.90338
2160.18878 0.945	2160.18878 0.90375
2158.26004 0.94522	2158.26004 0.90413
2156.3313 0.94549	2156.3313 0.90451
2154.40256 0.94573	2154.40256 0.9049
2152.47382 0.94591	2152.47382 0.9053
2150.54508 0.94609	2150.54508 0.90571
2148.61634 0.94629	2148.61634 0.90611
2146.6876 0.94652	2146.6876 0.90652
2144.75886 0.94678	2144.75886 0.90694
2142.83012 0.94701	2142.83012 0.90736
2140.90138 0.9472	2140.90138 0.9078
2138.97264 0.94742	2138.97264 0.90824
2137.0439 0.94769	2137.0439 0.90869
2135.11516 0.94796	2135.11516 0.90915

2133.18642 0.94819	2133.18642 0.9096
2131.25768 0.94838	2131.25768 0.91007
2129.32894 0.94861	2129.32894 0.91054
2127.4002 0.94891	2127.4002 0.91102
2125.47146 0.9493	2125.47146 0.91152
2123.54272 0.94966	2123.54272 0.91202
2121.61398 0.94992	2121.61398 0.91252
2119.68524 0.95017	2119.68524 0.91304
2117.7565 0.95047	2117.7565 0.91357
2115.82776 0.95083	2115.82776 0.91412
2113.89902 0.95119	2113.89902 0.91468
2111.97028 0.95151	2111.97028 0.91524
2110.04154 0.95179	2110.04154 0.9158
2108.1128 0.95209	2108.1128 0.91637
2106.18406 0.95242	2106.18406 0.91694
2104.25532 0.95282	2104.25532 0.91753
2102.32658 0.95322	2102.32658 0.91814
2100.39784 0.95354	2100.39784 0.91875
2098.4691 0.95381	2098.4691 0.91937
2096.54036 0.95413	2096.54036 0.91998
2094.61162 0.95453	2094.61162 0.9206
2092.68288 0.95496	2092.68288 0.92123
2090.75414 0.95533	2090.75414 0.92187
2088.8254 0.95563	2088.8254 0.92251
2086.89666 0.95592	2086.89666 0.92315
2084.96792 0.95626	2084.96792 0.92379
2083.03918 0.9567	2083.03918 0.92443
2081.11044 0.95718	2081.11044 0.92508
2079.1817 0.95757	2079.1817 0.92574
2077.25296 0.95788	2077.25296 0.92642
2075.32422 0.95823	2075.32422 0.9271
2073.39548 0.9587	2073.39548 0.92779
2071.46674 0.95925	2071.46674 0.92849
2069.538 0.95973	2069.538 0.92919
2067.60926 0.96005	2067.60926 0.92991
2065.68052 0.9603	2065.68052 0.93064
2063.75178 0.96069	2063.75178 0.93138
2061.82304 0.96126	2061.82304 0.93212
2059.8943 0.96188	2059.8943 0.93285
2057.96556 0.96237	2057.96556 0.93359
2056.03682 0.96268	2056.03682 0.93433
2054.10808 0.96295	2054.10808 0.93508
2052.17934 0.96341	2052.17934 0.93584
2050.2506 0.96403	2050.2506 0.93659

2048.32186 0.96458	2048.32186 0.93734
2046.39312 0.96494	2046.39312 0.93808
2044.46438 0.96519	2044.46438 0.93883
2042.53564 0.96554	2042.53564 0.93959
2040.6069 0.96609	2040.6069 0.94035
2038.67816 0.96675	2038.67816 0.94111
2036.74942 0.96726	2036.74942 0.94188
2034.82068 0.96759	2034.82068 0.94264
2032.89194 0.96796	2032.89194 0.9434
2030.9632 0.96851	2030.9632 0.94417
2029.03446 0.96917	2029.03446 0.94496
2027.10572 0.9697	2027.10572 0.94574
2025.17698 0.97001	2025.17698 0.94654
2023.24824 0.97029	2023.24824 0.94733
2021.3195 0.97075	2021.3195 0.94812
2019.39076 0.97139	2019.39076 0.94891
2017.46202 0.97202	2017.46202 0.94971
2015.53328 0.97249	2015.53328 0.9505
2013.60454 0.97282	2013.60454 0.95129
2011.6758 0.97315	2011.6758 0.95207
2009.74706 0.97369	2009.74706 0.95284
2007.81832 0.97439	2007.81832 0.95361
2005.88958 0.97496	2005.88958 0.95439
2003.96084 0.97533	2003.96084 0.95518
2002.0321 0.97564	2002.0321 0.95597
2000.10336 0.97611	2000.10336 0.95677
1998.17462 0.97674	1998.17462 0.95756
1996.24588 0.9773	1996.24588 0.95834
1994.31714 0.97759	1994.31714 0.95913
1992.3884 0.97774	1992.3884 0.95991
1990.45966 0.9781	1990.45966 0.96068
1988.53092 0.97872	1988.53092 0.96144
1986.60218 0.97941	1986.60218 0.96218
1984.67344 0.97998	1984.67344 0.96291
1982.7447 0.98036	1982.7447 0.96364
1980.81596 0.98066	1980.81596 0.96437
1978.88722 0.98107	1978.88722 0.96511
1976.95848 0.9816	1976.95848 0.96585
1975.02974 0.98213	1975.02974 0.96659
1973.101 0.98253	1973.101 0.96732
1971.17226 0.98281	1971.17226 0.96806
1969.24352 0.98307	1969.24352 0.96879
1967.31478 0.98347	1967.31478 0.96952
1965.38604 0.98403	1965.38604 0.97025

1963.4573 0.98457	1963.4573 0.97096
1961.52856 0.98497	1961.52856 0.97165
1959.59982 0.98532	1959.59982 0.97234
1957.67108 0.9857	1957.67108 0.97302
1955.74234 0.98613	1955.74234 0.97371
1953.8136 0.98659	1953.8136 0.9744
1951.88486 0.987	1951.88486 0.97509
1949.95612 0.98733	1949.95612 0.97576
1948.02738 0.98759	1948.02738 0.97641
1946.09864 0.98777	1946.09864 0.97706
1944.1699 0.9879	1944.1699 0.97768
1942.24116 0.98818	1942.24116 0.97829
1940.31242 0.98866	1940.31242 0.97887
1938.38368 0.98907	1938.38368 0.97941
1936.45494 0.9893	1936.45494 0.97993
1934.5262 0.98949	1934.5262 0.98043
1932.59746 0.98972	1932.59746 0.98092
1930.66872 0.98999	1930.66872 0.98142
1928.73998 0.99022	1928.73998 0.98193
1926.81124 0.99031	1926.81124 0.98244
1924.8825 0.9903	1924.8825 0.98296
1922.95376 0.99042	1922.95376 0.98348
1921.02502 0.99076	1921.02502 0.98402
1919.09628 0.99111	1919.09628 0.98457
1917.16754 0.99152	1917.16754 0.98514
1915.2388 0.99209	1915.2388 0.98572
1913.31006 0.99261	1913.31006 0.9863
1911.38132 0.99304	1911.38132 0.98687
1909.45258 0.99353	1909.45258 0.98745
1907.52384 0.99404	1907.52384 0.98805
1905.5951 0.99444	1905.5951 0.98865
1903.66636 0.99476	1903.66636 0.98926
1901.73762 0.99515	1901.73762 0.98986
1899.80888 0.99565	1899.80888 0.99045
1897.88014 0.9961	1897.88014 0.99103
1895.9514 0.99638	1895.9514 0.9916
1894.02266 0.9966	1894.02266 0.99216
1892.09392 0.99683	1892.09392 0.9927
1890.16518 0.99713	1890.16518 0.99321
1888.23644 0.99762	1888.23644 0.99369
1886.3077 0.99813	1886.3077 0.99416
1884.37896 0.99842	1884.37896 0.9946
1882.45022 0.99859	1882.45022 0.99505
1880.52148 0.99885	1880.52148 0.99551

1878.59274 0.99925	1878.59274 0.99596
1876.664 0.99964	1876.664 0.99642
1874.73526 0.99985	1874.73526 0.99686
1872.80652 0.99978	1872.80652 0.9973
1870.87778 0.99956	1870.87778 0.99772
1868.94904 0.99953	1868.94904 0.99811
1867.0203 0.99997	1867.0203 0.99848
1865.09156 1.00058	1865.09156 0.99882
1863.16282 1.00089	1863.16282 0.99913
1861.23408 1.00094	1861.23408 0.99941
1859.30534 1.00107	1859.30534 0.99968
1857.3766 1.00142	1857.3766 0.99996
1855.44786 1.00179	1855.44786 1.00024
1853.51912 1.00192	1853.51912 1.00052
1851.59038 1.00182	1851.59038 1.0008
1849.66164 1.00167	1849.66164 1.00106
1847.7329 1.00162	1847.7329 1.00129
1845.80416 1.00161	1845.80416 1.00148
1843.87542 1.00167	1843.87542 1.00165
1841.94668 1.00183	1841.94668 1.00177
1840.01794 1.0019	1840.01794 1.00186
1838.0892 1.00189	1838.0892 1.00192
1836.16046 1.00203	1836.16046 1.00196
1834.23172 1.00216	1834.23172 1.00197
1832.30298 1.00187	1832.30298 1.00195
1830.37424 1.00127	1830.37424 1.0019
1828.4455 1.00092	1828.4455 1.00177
1826.51676 1.00093	1826.51676 1.00159
1824.58802 1.0011	1824.58802 1.00134
1822.65928 1.0012	1822.65928 1.00106
1820.73054 1.00093	1820.73054 1.00077
1818.8018 1.00038	1818.8018 1.0005
1816.87306 1	1816.87306 1.00029
1814.94432 1.00006	1814.94432 1.00015
1813.01558 0.99997	1813.01558 1.0001
1811.08684 0.9996	1811.08684 1.00012
1809.1581 0.99918	1809.1581 1.0002
1807.22936 0.99889	1807.22936 1.00031
1805.30062 0.99868	1805.30062 1.00041
1803.37188 0.99834	1803.37188 1.00048
1801.44314 0.99783	1801.44314 1.0005
1799.5144 0.99727	1799.5144 1.00046
1797.58566 0.99674	1797.58566 1.00036
1795.65692 0.99627	1795.65692 1.00019

1793.72818 0.99586	1793.72818 0.99995
1791.79944 0.99548	1791.79944 0.99962
1789.8707 0.99505	1789.8707 0.99921
1787.94196 0.99432	1787.94196 0.9987
1786.01322 0.99331	1786.01322 0.99809
1784.08448 0.99246	1784.08448 0.99739
1782.15574 0.99178	1782.15574 0.99657
1780.227 0.99096	1780.227 0.99562
1778.29826 0.98984	1778.29826 0.99455
1776.36952 0.9884	1776.36952 0.99336
1774.44078 0.98684	1774.44078 0.99205
1772.51204 0.98539	1772.51204 0.99062
1770.5833 0.9839	1770.5833 0.98905
1768.65456 0.98213	1768.65456 0.9873
1766.72582 0.98013	1766.72582 0.98533
1764.79708 0.97798	1764.79708 0.98311
1762.86834 0.97568	1762.86834 0.98059
1760.9396 0.97324	1760.9396 0.97777
1759.01086 0.9704	1759.01086 0.9746
1757.08212 0.96691	1757.08212 0.97106
1755.15338 0.96303	1755.15338 0.96712
1753.22464 0.95883	1753.22464 0.96276
1751.2959 0.95431	1751.2959 0.95798
1749.36716 0.94965	1749.36716 0.95278
1747.43842 0.94474	1747.43842 0.94717
1745.50968 0.93943	1745.50968 0.94115
1743.58094 0.9339	1743.58094 0.93473
1741.6522 0.92846	1741.6522 0.92792
1739.72346 0.92298	1739.72346 0.92074
1737.79472 0.91714	1737.79472 0.91321
1735.86598 0.91072	1735.86598 0.90536
1733.93724 0.9041	1733.93724 0.8972
1732.0085 0.89784	1732.0085 0.88877
1730.07976 0.89187	1730.07976 0.88012
1728.15102 0.88586	1728.15102 0.87133
1726.22228 0.87959	1726.22228 0.8625
1724.29354 0.87319	1724.29354 0.85371
1722.3648 0.86707	1722.3648 0.84504
1720.43606 0.8613	1720.43606 0.83648
1718.50732 0.85569	1718.50732 0.82802
1716.57859 0.85019	1716.57859 0.81961
1714.64985 0.84469	1714.64985 0.81119
1712.72111 0.83906	1712.72111 0.80274
1710.79237 0.83323	1710.79237 0.79422

1708.86363 0.82712	1708.86363 0.78562
1706.93489 0.82072	1706.93489 0.77694
1705.00615 0.81426	1705.00615 0.76821
1703.07741 0.80777	1703.07741 0.75946
1701.14867 0.80131	1701.14867 0.75073
1699.21993 0.79529	1699.21993 0.74204
1697.29119 0.78969	1697.29119 0.73339
1695.36245 0.78414	1695.36245 0.72477
1693.43371 0.77859	1693.43371 0.71613
1691.50497 0.77289	1691.50497 0.70743
1689.57623 0.76695	1689.57623 0.69862
1687.64749 0.76083	1687.64749 0.68968
1685.71875 0.75435	1685.71875 0.68059
1683.79001 0.74762	1683.79001 0.67134
1681.86127 0.74101	1681.86127 0.66192
1679.93253 0.73451	1679.93253 0.65237
1678.00379 0.72784	1678.00379 0.64272
1676.07505 0.72083	1676.07505 0.63302
1674.14631 0.71362	1674.14631 0.62334
1672.21757 0.70634	1672.21757 0.61372
1670.28883 0.69915	1670.28883 0.60418
1668.36009 0.69235	1668.36009 0.59475
1666.43135 0.68581	1666.43135 0.58547
1664.50261 0.67908	1664.50261 0.57635
1662.57387 0.67225	1662.57387 0.56745
1660.64513 0.66568	1660.64513 0.55879
1658.71639 0.65935	1658.71639 0.55039
1656.78765 0.65301	1656.78765 0.54225
1654.85891 0.6465	1654.85891 0.53436
1652.93017 0.64019	1652.93017 0.52673
1651.00143 0.63444	1651.00143 0.51937
1649.07269 0.62898	1649.07269 0.51234
1647.14395 0.62369	1647.14395 0.50566
1645.21521 0.61877	1645.21521 0.49937
1643.28647 0.61406	1643.28647 0.4935
1641.35773 0.60936	1641.35773 0.48808
1639.42899 0.60488	1639.42899 0.48312
1637.50025 0.60086	1637.50025 0.47863
1635.57151 0.59748	1635.57151 0.4746
1633.64277 0.59467	1633.64277 0.471
1631.71403 0.59207	1631.71403 0.4678
1629.78529 0.58949	1629.78529 0.46495
1627.85655 0.58713	1627.85655 0.46239
1625.92781 0.58517	1625.92781 0.46009

1623.99907 0.58345	1623.99907 0.45803
1622.07033 0.58185	1622.07033 0.45617
1620.14159 0.58031	1620.14159 0.45451
1618.21285 0.57887	1618.21285 0.453
1616.28411 0.57779	1616.28411 0.45162
1614.35537 0.57717	1614.35537 0.45036
1612.42663 0.57669	1612.42663 0.44924
1610.49789 0.57609	1610.49789 0.44825
1608.56915 0.57554	1608.56915 0.44741
1606.64041 0.5753	1606.64041 0.44675
1604.71167 0.57544	1604.71167 0.44626
1602.78293 0.57584	1602.78293 0.44599
1600.85419 0.57639	1600.85419 0.44596
1598.92545 0.57705	1598.92545 0.44621
1596.99671 0.5779	1596.99671 0.44678
1595.06797 0.57915	1595.06797 0.4477
1593.13923 0.58085	1593.13923 0.44898
1591.21049 0.58284	1591.21049 0.45063
1589.28175 0.58496	1589.28175 0.45265
1587.35301 0.58729	1587.35301 0.45507
1585.42427 0.59002	1585.42427 0.45789
1583.49553 0.59324	1583.49553 0.46114
1581.56679 0.59683	1581.56679 0.4648
1579.63805 0.60056	1579.63805 0.46888
1577.70931 0.60439	1577.70931 0.47333
1575.78057 0.60857	1575.78057 0.47815
1573.85183 0.61322	1573.85183 0.48329
1571.92309 0.61809	1571.92309 0.48875
1569.99435 0.62299	1569.99435 0.49446
1568.06561 0.62799	1568.06561 0.50039
1566.13687 0.63308	1566.13687 0.50648
1564.20813 0.6382	1564.20813 0.51267
1562.27939 0.64324	1562.27939 0.51892
1560.35065 0.64807	1560.35065 0.5252
1558.42191 0.65292	1558.42191 0.53146
1556.49317 0.658	1556.49317 0.53768
1554.56443 0.66309	1554.56443 0.54382
1552.63569 0.668	1552.63569 0.54983
1550.70695 0.67277	1550.70695 0.55569
1548.77821 0.67741	1548.77821 0.56137
1546.84947 0.68169	1546.84947 0.56686
1544.92073 0.68545	1544.92073 0.57211
1542.99199 0.68899	1542.99199 0.57711
1541.06325 0.69264	1541.06325 0.58182

1539.13451 0.69642	1539.13451 0.58623
1537.20577 0.70007	1537.20577 0.59034
1535.27703 0.7032	1535.27703 0.59416
1533.34829 0.706	1533.34829 0.59771
1531.41955 0.70888	1531.41955 0.60099
1529.49081 0.7117	1529.49081 0.604
1527.56207 0.7142	1527.56207 0.60672
1525.63333 0.71639	1525.63333 0.60914
1523.70459 0.7182	1523.70459 0.61125
1521.77585 0.71974	1521.77585 0.61306
1519.84711 0.72135	1519.84711 0.61458
1517.91837 0.723	1517.91837 0.6158
1515.98963 0.72448	1515.98963 0.61674
1514.06089 0.72565	1514.06089 0.6174
1512.13215 0.72642	1512.13215 0.6178
1510.20341 0.72692	1510.20341 0.61794
1508.27467 0.72744	1508.27467 0.61783
1506.34593 0.72822	1506.34593 0.61748
1504.41719 0.72904	1504.41719 0.61687
1502.48845 0.72944	1502.48845 0.61599
1500.55971 0.72935	1500.55971 0.61484
1498.63097 0.72913	1498.63097 0.61343
1496.70223 0.72897	1496.70223 0.61176
1494.77349 0.72866	1494.77349 0.60985
1492.84475 0.72787	1492.84475 0.6077
1490.91601 0.72664	1490.91601 0.60533
1488.98727 0.7255	1488.98727 0.6028
1487.05853 0.72471	1487.05853 0.60016
1485.12979 0.72401	1485.12979 0.59747
1483.20105 0.7232	1483.20105 0.59478
1481.27231 0.72239	1481.27231 0.59212
1479.34357 0.72166	1479.34357 0.58948
1477.41483 0.7209	1477.41483 0.58686
1475.48609 0.71999	1475.48609 0.58423
1473.55735 0.71893	1473.55735 0.58158
1471.62861 0.71772	1471.62861 0.57889
1469.69987 0.71644	1469.69987 0.57615
1467.77113 0.71502	1467.77113 0.57332
1465.84239 0.71338	1465.84239 0.57038
1463.91365 0.71163	1463.91365 0.56732
1461.98491 0.70963	1461.98491 0.56413
1460.05617 0.70706	1460.05617 0.56082
1458.12743 0.70416	1458.12743 0.55743
1456.19869 0.70165	1456.19869 0.55401

1454.26995 0.69969	1454.26995 0.55064
1452.34121 0.69785	1452.34121 0.54743
1450.41247 0.69588	1450.41247 0.54447
1448.48373 0.69391	1448.48373 0.54184
1446.55499 0.69207	1446.55499 0.53957
1444.62625 0.69027	1444.62625 0.53766
1442.69751 0.68829	1442.69751 0.53607
1440.76877 0.68595	1440.76877 0.53473
1438.84003 0.6831	1438.84003 0.5336
1436.91129 0.67998	1436.91129 0.53263
1434.98255 0.67706	1434.98255 0.53181
1433.05381 0.67427	1433.05381 0.53115
1431.12507 0.67141	1431.12507 0.53066
1429.19633 0.66866	1429.19633 0.5303
1427.26759 0.66601	1427.26759 0.53
1425.33885 0.66329	1425.33885 0.52961
1423.41011 0.66057	1423.41011 0.52895
1421.48137 0.65789	1421.48137 0.52788
1419.55263 0.65526	1419.55263 0.52629
1417.62389 0.65284	1417.62389 0.52418
1415.69515 0.65057	1415.69515 0.52167
1413.76641 0.64813	1413.76641 0.51892
1411.83767 0.64554	1411.83767 0.51613
1409.90893 0.64308	1409.90893 0.51347
1407.98019 0.64072	1407.98019 0.51109
1406.05145 0.63833	1406.05145 0.50902
1404.12271 0.63594	1404.12271 0.50724
1402.19397 0.6337	1402.19397 0.50571
1400.26523 0.63169	1400.26523 0.50433
1398.33649 0.62996	1398.33649 0.50305
1396.40775 0.62847	1396.40775 0.50184
1394.47901 0.62706	1394.47901 0.50074
1392.55027 0.62568	1392.55027 0.49981
1390.62153 0.62419	1390.62153 0.49909
1388.69279 0.62241	1388.69279 0.49865
1386.76405 0.62041	1386.76405 0.49849
1384.83531 0.61887	1384.83531 0.49863
1382.90657 0.6186	1382.90657 0.49907
1380.97783 0.61951	1380.97783 0.49984
1379.04909 0.62088	1379.04909 0.50099
1377.12035 0.62237	1377.12035 0.50256
1375.19161 0.62398	1375.19161 0.50454
1373.26287 0.62577	1373.26287 0.50692
1371.33413 0.62782	1371.33413 0.50967

1369.40539 0.63026	1369.40539 0.51271
1367.47665 0.63303	1367.47665 0.516
1365.54791 0.63574	1365.54791 0.51949
1363.61917 0.638	1363.61917 0.52313
1361.69043 0.64002	1361.69043 0.5269
1359.76169 0.64226	1359.76169 0.53079
1357.83295 0.64486	1357.83295 0.53481
1355.90421 0.64776	1355.90421 0.53898
1353.97547 0.65072	1353.97547 0.54331
1352.04673 0.65353	1352.04673 0.5478
1350.11799 0.65627	1350.11799 0.55242
1348.18925 0.65928	1348.18925 0.55712
1346.26051 0.66262	1346.26051 0.56185
1344.33177 0.66593	1344.33177 0.56658
1342.40303 0.66871	1342.40303 0.5713
1340.47429 0.67104	1340.47429 0.57602
1338.54555 0.67357	1338.54555 0.58076
1336.61681 0.67672	1336.61681 0.58553
1334.68807 0.68029	1334.68807 0.59031
1332.75933 0.68374	1332.75933 0.59509
1330.83059 0.68673	1330.83059 0.59982
1328.90185 0.68938	1328.90185 0.60448
1326.97311 0.69203	1326.97311 0.60903
1325.04437 0.69482	1325.04437 0.61342
1323.11563 0.69753	1323.11563 0.61765
1321.18689 0.69978	1321.18689 0.62173
1319.25815 0.70159	1319.25815 0.62572
1317.32941 0.70334	1317.32941 0.62969
1315.40067 0.70548	1315.40067 0.63371
1313.47193 0.70814	1313.47193 0.63784
1311.54319 0.71107	1311.54319 0.64208
1309.61445 0.71387	1309.61445 0.64643
1307.68571 0.71649	1307.68571 0.65085
1305.75697 0.71924	1305.75697 0.6553
1303.82823 0.7223	1303.82823 0.65973
1301.89949 0.72552	1301.89949 0.6641
1299.97075 0.72845	1299.97075 0.66836
1298.04201 0.73087	1298.04201 0.67244
1296.11327 0.733	1296.11327 0.67631
1294.18453 0.7352	1294.18453 0.67996
1292.25579 0.7375	1292.25579 0.68338
1290.32705 0.73961	1290.32705 0.68659
1288.39831 0.74126	1288.39831 0.68958
1286.46957 0.74248	1286.46957 0.69234

1284.54083 0.74351	1284.54083 0.69486
1282.61209 0.74456	1282.61209 0.69715
1280.68335 0.74558	1280.68335 0.69924
1278.75461 0.74636	1278.75461 0.70117
1276.82587 0.74681	1276.82587 0.70298
1274.89713 0.74713	1274.89713 0.7047
1272.96839 0.74761	1272.96839 0.70632
1271.03965 0.7484	1271.03965 0.70787
1269.11091 0.74938	1269.11091 0.70937
1267.18217 0.75031	1267.18217 0.71088
1265.25343 0.7511	1265.25343 0.71245
1263.32469 0.75189	1263.32469 0.71411
1261.39595 0.75291	1261.39595 0.71587
1259.46721 0.75423	1259.46721 0.71769
1257.53847 0.75565	1257.53847 0.71956
1255.60973 0.75694	1255.60973 0.72147
1253.68099 0.75804	1253.68099 0.72342
1251.75225 0.7591	1251.75225 0.72537
1249.82351 0.76023	1249.82351 0.72732
1247.89477 0.76145	1247.89477 0.72924
1245.96603 0.76264	1245.96603 0.73111
1244.03729 0.76369	1244.03729 0.73297
1242.10855 0.76469	1242.10855 0.73488
1240.17981 0.76584	1240.17981 0.73687
1238.25107 0.76723	1238.25107 0.73899
1236.32233 0.76871	1236.32233 0.74123
1234.39359 0.77012	1234.39359 0.74356
1232.46485 0.7715	1232.46485 0.74596
1230.53611 0.77295	1230.53611 0.74842
1228.60737 0.77455	1228.60737 0.75096
1226.67863 0.77625	1226.67863 0.75357
1224.74989 0.77792	1224.74989 0.75623
1222.82115 0.77949	1222.82115 0.75889
1220.89241 0.78104	1220.89241 0.76151
1218.96367 0.7827	1218.96367 0.7641
1217.03493 0.78449	1217.03493 0.76669
1215.10619 0.78625	1215.10619 0.76931
1213.17745 0.78783	1213.17745 0.77201
1211.24871 0.78929	1211.24871 0.77479
1209.31997 0.79086	1209.31997 0.77763
1207.39123 0.79267	1207.39123 0.78052
1205.46249 0.79461	1205.46249 0.78345
1203.53375 0.79644	1203.53375 0.78642
1201.60501 0.79809	1201.60501 0.78941

1199.67627 0.79967	1199.67627 0.79238
1197.74753 0.80129	1197.74753 0.79525
1195.81879 0.80289	1195.81879 0.79798
1193.89005 0.80427	1193.89005 0.80051
1191.96131 0.80536	1191.96131 0.80288
1190.03257 0.80631	1190.03257 0.80511
1188.10383 0.80729	1188.10383 0.80722
1186.17509 0.80829	1186.17509 0.80919
1184.24635 0.8091	1184.24635 0.81099
1182.31761 0.80962	1182.31761 0.81259
1180.38887 0.80998	1180.38887 0.81399
1178.46013 0.81039	1178.46013 0.81523
1176.53139 0.81089	1176.53139 0.81631
1174.60265 0.8113	1174.60265 0.81725
1172.67391 0.81154	1172.67391 0.818
1170.74517 0.8117	1170.74517 0.81854
1168.81643 0.81193	1168.81643 0.81885
1166.88769 0.81221	1166.88769 0.81897
1164.95895 0.81243	1164.95895 0.81895
1163.03021 0.81252	1163.03021 0.81886
1161.10147 0.8124	1161.10147 0.81875
1159.17273 0.81221	1159.17273 0.81865
1157.24399 0.81219	1157.24399 0.81859
1155.31525 0.81241	1155.31525 0.8186
1153.38651 0.81275	1153.38651 0.81871
1151.45777 0.81305	1151.45777 0.81891
1149.52903 0.81326	1149.52903 0.81913
1147.60029 0.81338	1147.60029 0.81924
1145.67155 0.81344	1145.67155 0.81911
1143.74281 0.81327	1143.74281 0.81862
1141.81407 0.81262	1141.81407 0.81773
1139.88533 0.81145	1139.88533 0.81643
1137.95659 0.80996	1137.95659 0.81475
1136.02785 0.80841	1136.02785 0.81272
1134.09911 0.80687	1134.09911 0.81034
1132.17037 0.80511	1132.17037 0.80764
1130.24163 0.80291	1130.24163 0.80463
1128.31289 0.80038	1128.31289 0.80138
1126.38415 0.79785	1126.38415 0.79794
1124.45541 0.79543	1124.45541 0.79431
1122.52667 0.79297	1122.52667 0.79051
1120.59793 0.79023	1120.59793 0.7865
1118.66919 0.78718	1118.66919 0.78229
1116.74045 0.78407	1116.74045 0.77791

1114.81171 0.78113	1114.81171 0.77337
1112.88297 0.77834	1112.88297 0.76871
1110.95423 0.77539	1110.95423 0.76387
1109.02549 0.77198	1109.02549 0.75876
1107.09675 0.76808	1107.09675 0.75327
1105.16801 0.7638	1105.16801 0.74731
1103.23927 0.75906	1103.23927 0.74084
1101.31053 0.75356	1101.31053 0.7339
1099.38179 0.74715	1099.38179 0.72656
1097.45305 0.74008	1097.45305 0.71894
1095.52431 0.73296	1095.52431 0.71122
1093.59557 0.7265	1093.59557 0.70358
1091.66683 0.72121	1091.66683 0.69628
1089.73809 0.71731	1089.73809 0.68952
1087.80935 0.71474	1087.80935 0.6835
1085.88061 0.71331	1085.88061 0.67828
1083.95187 0.71278	1083.95187 0.67385
1082.02313 0.71288	1082.02313 0.67011
1080.09439 0.71338	1080.09439 0.66694
1078.16565 0.71404	1078.16565 0.66425
1076.23691 0.7147	1076.23691 0.66197
1074.30817 0.71525	1074.30817 0.66004
1072.37943 0.71575	1072.37943 0.65839
1070.45069 0.71614	1070.45069 0.65692
1068.52195 0.71628	1068.52195 0.65545
1066.59321 0.71596	1066.59321 0.65381
1064.66447 0.71498	1064.66447 0.65177
1062.73573 0.71299	1062.73573 0.64912
1060.80699 0.70945	1060.80699 0.64569
1058.87825 0.70383	1058.87825 0.64141
1056.94951 0.69617	1056.94951 0.63634
1055.02077 0.68731	1055.02077 0.63075
1053.09203 0.67887	1053.09203 0.62509
1051.16329 0.67259	1051.16329 0.61988
1049.23455 0.66952	1049.23455 0.61565
1047.30581 0.66985	1047.30581 0.61279
1045.37707 0.67303	1045.37707 0.61146
1043.44833 0.67816	1043.44833 0.6116
1041.51959 0.68428	1041.51959 0.61295
1039.59085 0.69063	1039.59085 0.61514
1037.66211 0.69659	1037.66211 0.61772
1035.73337 0.70162	1035.73337 0.62031
1033.80463 0.70547	1033.80463 0.62258
1031.87589 0.70823	1031.87589 0.62434

1029.94715 0.71016	1029.94715 0.62552
1028.01841 0.71152	1028.01841 0.62616
1026.08967 0.71252	1026.08967 0.62642
1024.16093 0.71334	1024.16093 0.62646
1022.23219 0.71407	1022.23219 0.62643
1020.30345 0.71475	1020.30345 0.62643
1018.37471 0.71536	1018.37471 0.62651
1016.44597 0.71591	1016.44597 0.62667
1014.51723 0.71644	1014.51723 0.62689
1012.58849 0.71699	1012.58849 0.62717
1010.65975 0.71759	1010.65975 0.62748
1008.73101 0.7182	1008.73101 0.62775
1006.80227 0.71868	1006.80227 0.62789
1004.87353 0.7189	1004.87353 0.62781
1002.94479 0.71885	1002.94479 0.6274
1001.01605 0.7186	1001.01605 0.62663
999.08731 0.71809	999.08731 0.62548
997.15857 0.71716	997.15857 0.624
995.22983 0.71579	995.22983 0.62225
993.30109 0.71423	993.30109 0.62033
991.37235 0.71272	991.37235 0.61834
989.44361 0.71133	989.44361 0.61643
987.51487 0.70997	987.51487 0.61473
985.58613 0.70862	985.58613 0.6134
983.65739 0.70766	983.65739 0.61255
981.72865 0.7075	981.72865 0.61226
979.79991 0.70811	979.79991 0.61254
977.87117 0.70913	977.87117 0.61341
975.94243 0.7104	975.94243 0.61487
974.01369 0.712	974.01369 0.61692
972.08495 0.71406	972.08495 0.6196
970.15621 0.71661	970.15621 0.62292
968.22747 0.71959	968.22747 0.62687
966.29873 0.72291	966.29873 0.63147
964.36999 0.72659	964.36999 0.63671
962.44125 0.7308	962.44125 0.64263
960.51251 0.73568	960.51251 0.64931
958.58377 0.74118	958.58377 0.65679
956.65503 0.7472	956.65503 0.66512
954.72629 0.75369	954.72629 0.67427
952.79755 0.76069	952.79755 0.68418
950.86881 0.7682	950.86881 0.69479
948.94007 0.77615	948.94007 0.70602
947.01133 0.78441	947.01133 0.71783

945.08259	0.79285	945.08259	0.73015
943.15385	0.80149	943.15385	0.74292
941.22511	0.81036	941.22511	0.756
939.29637	0.81935	939.29637	0.7693
937.36763	0.82829	937.36763	0.78269
935.43889	0.83715	935.43889	0.79612
933.51015	0.84599	933.51015	0.80953
931.58141	0.85475	931.58141	0.82284
929.65267	0.86325	929.65267	0.83591
927.72393	0.87135	927.72393	0.84855
925.79519	0.87907	925.79519	0.86059
923.86645	0.88642	923.86645	0.8719
921.93771	0.89327	921.93771	0.88242
920.00897	0.89943	920.00897	0.89216
918.08023	0.90486	918.08023	0.9011
916.15149	0.9097	916.15149	0.90927
914.22275	0.91419	914.22275	0.91667
912.29401	0.91843	912.29401	0.92338
910.36527	0.92232	910.36527	0.92952
908.43653	0.9258	908.43653	0.93528
906.50779	0.92906	906.50779	0.9408
904.57905	0.93226	904.57905	0.94613
902.65031	0.93533	902.65031	0.95125
900.72157	0.93796	900.72157	0.95601
898.79283	0.93988	898.79283	0.96019
896.86409	0.94111	896.86409	0.96353
894.93535	0.94174	894.93535	0.96569
893.00661	0.94158	893.00661	0.9663
891.07787	0.94006	891.07787	0.96506
889.14913	0.93663	889.14913	0.96192
887.22039	0.93127	887.22039	0.95714
885.29165	0.92469	885.29165	0.9513
883.36291	0.91809	883.36291	0.94517
881.43417	0.91298	881.43417	0.9395
879.50543	0.91069	879.50543	0.93481
877.57669	0.91171	877.57669	0.93138
875.64795	0.91542	875.64795	0.92923
873.71921	0.92056	873.71921	0.92827
871.79047	0.92575	871.79047	0.9284
869.86173	0.92989	869.86173	0.92947
867.93299	0.93261	867.93299	0.93135
866.00425	0.93425	866.00425	0.93386
864.07551	0.9353	864.07551	0.93683
862.14677	0.93586	862.14677	0.94007

860.21803	0.93569	860.21803	0.94341
858.28929	0.93461	858.28929	0.94669
856.36055	0.93269	856.36055	0.94971
854.43181	0.93042	854.43181	0.9523
852.50307	0.92868	852.50307	0.95432
850.57433	0.92799	850.57433	0.95577
848.64559	0.92765	848.64559	0.9568
846.71685	0.9267	846.71685	0.95764
844.78811	0.92513	844.78811	0.95857
842.85937	0.92365	842.85937	0.95978
840.93063	0.9229	840.93063	0.96135
839.00189	0.92306	839.00189	0.96323
837.07315	0.92388	837.07315	0.96536
835.14441	0.9252	835.14441	0.96771
833.21567	0.92741	833.21567	0.97027
831.28693	0.93066	831.28693	0.97305
829.35819	0.93428	829.35819	0.97597
827.42945	0.9373	827.42945	0.97887
825.50071	0.93935	825.50071	0.98156
823.57197	0.94073	823.57197	0.98388
821.64323	0.9419	821.64323	0.9858
819.71449	0.94298	819.71449	0.98733
817.78575	0.94366	817.78575	0.98852
815.85701	0.94369	815.85701	0.98937
813.92827	0.94324	813.92827	0.98983
811.99953	0.94272	811.99953	0.9899
810.07079	0.94232	810.07079	0.98963
808.14205	0.94187	808.14205	0.98917
806.21331	0.9412	806.21331	0.98875
804.28457	0.94054	804.28457	0.98853
802.35583	0.94034	802.35583	0.98858
800.42709	0.9408	800.42709	0.98886
798.49835	0.94178	798.49835	0.98931
796.56961	0.94284	796.56961	0.98985
794.64087	0.94367	794.64087	0.99044
792.71213	0.94426	792.71213	0.991
790.78339	0.9448	790.78339	0.9914
788.85465	0.94527	788.85465	0.99147
786.92591	0.94533	786.92591	0.99108
784.99717	0.94462	784.99717	0.99023
783.06843	0.94328	783.06843	0.98905
781.13969	0.942	781.13969	0.98775
779.21095	0.94135	779.21095	0.98651
777.28221	0.94118	777.28221	0.9854

775.35347	0.94103	775.35347	0.98437
773.42473	0.94067	773.42473	0.98331
771.49599	0.94018	771.49599	0.9821
769.56725	0.93973	769.56725	0.98067
767.63851	0.9393	767.63851	0.97896
765.70977	0.93853	765.70977	0.97687
763.78103	0.93705	763.78103	0.9743
761.85229	0.93491	761.85229	0.97119
759.92355	0.93256	759.92355	0.96759
757.99481	0.93035	757.99481	0.9637
756.06607	0.92829	756.06607	0.95978
754.13733	0.92619	754.13733	0.95613
752.20859	0.92414	752.20859	0.95291
750.27985	0.92255	750.27985	0.9502
748.35111	0.92174	748.35111	0.94799
746.42237	0.92162	746.42237	0.94629
744.49363	0.92181	744.49363	0.94512
742.56489	0.92204	742.56489	0.94445
740.63615	0.92222	740.63615	0.94419
738.70741	0.92247	738.70741	0.94416
736.77867	0.9228	736.77867	0.94414
734.84993	0.92306	734.84993	0.944
732.92119	0.92307	732.92119	0.94369
730.99245	0.92288	730.99245	0.94328
729.06371	0.92256	729.06371	0.94284
727.13497	0.92213	727.13497	0.94243
725.20623	0.92163	725.20623	0.94202
723.27749	0.92117	723.27749	0.94156
721.34875	0.92069	721.34875	0.94104
719.42001	0.9201	719.42001	0.9405
717.49127	0.91936	717.49127	0.93996
715.56253	0.91843	715.56253	0.9394
713.63379	0.91734	713.63379	0.93872
711.70505	0.91616	711.70505	0.93777
709.77631	0.91469	709.77631	0.93649
707.84757	0.91277	707.84757	0.93492
705.91883	0.91059	705.91883	0.93322
703.99009	0.90868	703.99009	0.93152
702.06135	0.90757	702.06135	0.92987
700.13261	0.90722	700.13261	0.92822
698.20387	0.90696	698.20387	0.92649
696.27513	0.90626	696.27513	0.92466
694.34639	0.90522	694.34639	0.92279
692.41765	0.90428	692.41765	0.92104

690.48891	0.90363	690.48891	0.91955
688.56017	0.90298	688.56017	0.91839
686.63143	0.90197	686.63143	0.91755
684.70269	0.90077	684.70269	0.91697
682.77395	0.89999	682.77395	0.91661
680.84521	0.89983	680.84521	0.91647
678.91647	0.8998	678.91647	0.9165
676.98773	0.89932	676.98773	0.91662
675.05899	0.89835	675.05899	0.91673
673.13025	0.89745	673.13025	0.91676
671.20151	0.89733	671.20151	0.91673
669.27277	0.89808	669.27277	0.91679
667.34403	0.89915	667.34403	0.91709
665.41529	0.89993	665.41529	0.91772
663.48655	0.90039	663.48655	0.91865
661.55781	0.90114	661.55781	0.91976
659.62907	0.9025	659.62907	0.92087
657.70033	0.90383	657.70033	0.92187
655.77159	0.90446	655.77159	0.92274
653.84285	0.90435	653.84285	0.92346
651.91411	0.90409	651.91411	0.92401
649.98537	0.90426	649.98537	0.92434
648.05663	0.90475	648.05663	0.92437
646.12789	0.90476	646.12789	0.92409
644.19915	0.90376	644.19915	0.92355
642.27041	0.90212	642.27041	0.92287
640.34167	0.90075	640.34167	0.92217
638.41293	0.90009	638.41293	0.92147
636.48419	0.89977	636.48419	0.92071
634.55545	0.89903	634.55545	0.91984
632.62671	0.89779	632.62671	0.91879
630.69797	0.89678	630.69797	0.91758
628.76923	0.89665	628.76923	0.91629
626.84049	0.89708	626.84049	0.91496
624.91175	0.89704	624.91175	0.91358
622.98301	0.89578	622.98301	0.91213
621.05427	0.89375	621.05427	0.91062
619.12553	0.89213	619.12553	0.90908
617.19679	0.89149	617.19679	0.90763
615.26805	0.89117	615.26805	0.90636
613.33931	0.89031	613.33931	0.90529
611.41057	0.88915	611.41057	0.90436
609.48183	0.88878	609.48183	0.90348
607.55309	0.88974	607.55309	0.90261

605.62435	0.8914	605.62435	0.90173
603.69561	0.8925	603.69561	0.90091
601.76687	0.89243	601.76687	0.90015
599.83813	0.8916	599.83813	0.89942
597.90939	0.89112	597.90939	0.89861
595.98065	0.89167	595.98065	0.89765
594.05191	0.89258	594.05191	0.89651
592.12317	0.89265	592.12317	0.89526
590.19443	0.89174	590.19443	0.89398
588.26569	0.89071	588.26569	0.89273
586.33695	0.89033	586.33695	0.89148
584.40821	0.89057	584.40821	0.89019
582.47947	0.89069	582.47947	0.88884
580.55073	0.88997	580.55073	0.88747
578.62199	0.88859	578.62199	0.88618
576.69325	0.88765	576.69325	0.88503
574.76451	0.88787	574.76451	0.88401
572.83577	0.88846	572.83577	0.88304
570.90704	0.88813	570.90704	0.88203
568.9783	0.88688	568.9783	0.88097
567.04956	0.88573	567.04956	0.87992
565.12082	0.88545	565.12082	0.87898
563.19208	0.88592	563.19208	0.87826
561.26334	0.88642	561.26334	0.87777
559.3346	0.88621	559.3346	0.87748
557.40586	0.88549	557.40586	0.87739
555.47712	0.88528	555.47712	0.87751
553.54838	0.88628	553.54838	0.87788
551.61964	0.8879	551.61964	0.8785
549.6909	0.88892	549.6909	0.87928
547.76216	0.88885	547.76216	0.88004
545.83342	0.88831	545.83342	0.88064
543.90468	0.8883	543.90468	0.88102
541.97594	0.88915	541.97594	0.88125
540.0472	0.89005	540.0472	0.88145
538.11846	0.89003	538.11846	0.88174
536.18972	0.88923	536.18972	0.8821
534.26098	0.88884	534.26098	0.88247
532.33224	0.88949	532.33224	0.88282
530.4035	0.89073	530.4035	0.88314
528.47476	0.89165	528.47476	0.88354
526.54602	0.89159	526.54602	0.88406
524.61728	0.89104	524.61728	0.8847
522.68854	0.89118	522.68854	0.88534

520.7598	0.89235	520.7598	0.88588
518.83106	0.89367	518.83106	0.88628
516.90232	0.89414	516.90232	0.88659
514.97358	0.89391	514.97358	0.88691
513.04484	0.89399	513.04484	0.88727
511.1161	0.89482	511.1161	0.88763
509.18736	0.89599	509.18736	0.8879
507.25862	0.89691	507.25862	0.88806
505.32988	0.89716	505.32988	0.88817
503.40114	0.89709	503.40114	0.88836
501.4724	0.89769	501.4724	0.88871
499.54366	0.89917	499.54366	0.88917
497.61492	0.90079	497.61492	0.88959
495.68618	0.90174	495.68618	0.8898
493.75744	0.90174	493.75744	0.8897
491.8287	0.90125	491.8287	0.88928
489.89996	0.90112	489.89996	0.88856
487.97122	0.90138	487.97122	0.88749
486.04248	0.90106	486.04248	0.88596
484.11374	0.8993	484.11374	0.88383
482.185	0.8964	482.185	0.8811
480.25626	0.89355	480.25626	0.87788
478.32752	0.89139	478.32752	0.8744
476.39878	0.8897	476.39878	0.87092
474.47004	0.88765	474.47004	0.86759
472.5413	0.88471	472.5413	0.86455
470.61256	0.88175	470.61256	0.8619
468.68382	0.88026	468.68382	0.85981
466.75508	0.88086	466.75508	0.85848
464.82634	0.88267	464.82634	0.85799
462.8976	0.88426	462.8976	0.8583
460.96886	0.88506	460.96886	0.85918
459.04012	0.88578	459.04012	0.86043
457.11138	0.88763	457.11138	0.86192
455.18264	0.89066	455.18264	0.86371
453.2539	0.89353	453.2539	0.86591
451.32516	0.89535	451.32516	0.86862
449.39642	0.8969	449.39642	0.87181
447.46768	0.8996	447.46768	0.87537
445.53894	0.9038	445.53894	0.87919
443.6102	0.90851	443.6102	0.88322
441.68146	0.91216	441.68146	0.88747
439.75272	0.91427	439.75272	0.89193
437.82398	0.9163	437.82398	0.89649

435.89524	0.91998	435.89524	0.901
433.9665	0.92495	433.9665	0.90536
432.03776	0.92934	432.03776	0.90964
430.10902	0.93206	430.10902	0.91404
428.18028	0.93402	428.18028	0.91876
426.25154	0.93713	426.25154	0.9239
424.3228	0.94221	424.3228	0.9293
422.39406	0.94823	422.39406	0.93478
420.46532	0.95323	420.46532	0.94026
418.53658	0.9564	418.53658	0.94587
416.60784	0.95913	416.60784	0.95171
414.6791	0.96336	414.6791	0.95764
412.75036	0.96949	412.75036	0.96325
410.82162	0.97536	410.82162	0.9682
408.89288	0.97852	408.89288	0.9682
406.96414	0.97983	406.96414	0.9682
405.0354	0.98281	405.0354	0.9682
403.10666	0.98862	403.10666	0.9682
401.17792	0.99508	401.17792	0.9682
399.24918	1	399.24918	0.9682

Reference

- [1] D. Li, B. Zhang, F. Xuan, The sequestration of Sr(ii) and Cs(i) from aqueous solutions by magnetic graphene oxides, *J. Mol. Liq.* 209 (2015) 508-514. <https://doi.org/10.1016/j.molliq.2015.06.022>.
- [2] X. Wang, J. Yu, Application of Fe₃O₄/graphene oxide composite for the separation of Cs(i) and Sr(ii) from aqueous solution, *J. Radioanal. Nucl. Chem.* 303 (2015) 807-813. <https://doi.org/10.1007/s10967-014-3431-4>.
- [3] K. Gupta, B. Yuan, C. Chen, N. Varnakavi, M. Fu, K_{2x}Mn_xSn_{3-x}S₆ (x = 0.5–0.95) (KMS-1) immobilized on the reduced graphene oxide as KMS-1/r-GO aerogel to effectively remove Cs⁺ and Sr²⁺ from aqueous solution, *Chem. Eng. J.* 369 (2019) 803-812. <https://doi.org/10.1016/j.cej.2019.03.109>.
- [4] W. Mu, Q. Yu, X. Li, H. Wei, Y. Jian, Efficient removal of Cs⁺ and Sr²⁺ from aqueous solution using hierarchically structured hexagonal tungsten trioxide coated Fe₃O₄, *Chem. Eng. J.* 319 (2017) 170-178. <https://doi.org/10.1016/j.cej.2017.02.153>.
- [5] K.N. Palansooriya, I. Yoon, S. Kim, C. Wang, H. Kwon, S. Lee, A.D. Igalavithana, R. Mukhopadhyay, B. Sarkar, Y.S. Ok, Designer biochar with enhanced functionality for efficient removal of radioactive cesium and strontium from water, *Environ. Res.* 214 (2022) 114072. <https://doi.org/10.1016/j.envres.2022.114072>.
- [6] S. Eun, J. Ryu, H. Kim, H. Hong, S. Kim, Simultaneous removal of radioactive cesium and strontium from seawater using a highly efficient Prussian blue-embedded alginate aerogel, *J. Environ. Manage.* 297 (2021) 113389. <https://doi.org/10.1016/j.jenvman.2021.113389>.
- [7] C. Yao, Y. Dai, S. Chang, H. Zhang, Removal of cesium and strontium for radioactive wastewater by Prussian blue nanorods, *Environ. Sci. Pollut. Res.* 30 (2023) 36807-36823. <https://doi.org/10.1007/s11356-022-24618-w>.
- [8] J. Li, J. Jin, Y. Zou, H. Sun, X. Zeng, X. Huang, M. Feng, M.G. Kanatzidis,

- Efficient removal of Cs⁺ and Sr²⁺ ions by granulous (Me₂NH₂)_{4/3}(Me₃NH)_{2/3}Sn₃S₇·1.25H₂O/Polyacrylonitrile composite, ACS Appl. Mater. Interfaces. 13 (2021) 13434-13442.
<https://doi.org/10.1021/acsami.1c01983>.
- [9] L. Tan, S. Wang, W. Du, T. Hu, Effect of water chemistries on adsorption of Cs(i) onto graphene oxide investigated by batch and modeling techniques, Chem. Eng. J. 292 (2016) 92-97.
<https://doi.org/10.1016/j.cej.2016.01.073>.
- [10] M. Xing, S. Zhuang, J. Wang, Efficient removal of Cs(i) from aqueous solution using graphene oxide, Prog. Nucl. Energy. 119 (2020) 103167.
<https://doi.org/10.1016/j.pnucene.2019.103167>.
- [11] B. Jun, M. Jang, C.M. Park, J. Han, Y. Yoon, Selective adsorption of Cs⁺ by MXene (Ti₃C₂T_x) from model low-level radioactive wastewater, Nucl. Eng. Technol. 52 (2020) 1201-1207.
<https://doi.org/10.1016/j.net.2019.11.020>.
- [12] H. Li, L. Zhang, J. Chen, M. Lu, J. Xie, X. Wang, K. Han, J. Li, J. Lu, Reduced graphene oxide based aerogels: doped with ternary Prussian blue analogs and selective removal of Cs⁺ from effluent, J. Water Process. Eng. 47 (2022) 102741.
<https://doi.org/10.1016/j.jwpe.2022.102741>.
- [13] X. Liu, X. Wang, J. Li, X. Wang, Ozonated graphene oxides as high efficient sorbents for Sr(ii) and U(vi) removal from aqueous solutions, Science China Chemistry. 59 (2016) 869-877.
<https://doi.org/10.1007/s11426-016-5594-z>.
- [14] W.M.A. El Rouby, A.A. Farghali, M.A. Sadek, W.F. Khalil, Fast removal of Sr(ii) from water by graphene oxide and chitosan modified graphene oxide, J. Inorg. Organomet. Polym. Mater. 28 (2018) 2336-2349.
<https://doi.org/10.1007/s10904-018-0885-9>.
- [15] F.V. Alamdarlo, G. Solookinejad, F. Zahakifar, M.R. Jalal, M. Jabbari, Study of kinetic, thermodynamic, and isotherm of Sr adsorption from

aqueous solutions on graphene oxide (GO) and
(aminomethyl)phosphonic acid–graphene oxide (AMPA–GO), J.
Radioanal. Nucl. Chem. 329 (2021) 1033-1043.
<https://doi.org/10.1007/s10967-021-07845-2>.

- [16] Y. Meng, Y. Wang, Z. Ye, N. Wang, C. He, Y. Zhu, T. Fujita, H. Wu, X.
Wang, Three-dimension titanium phosphate aerogel for selective
removal of radioactive strontium(ii) from contaminated waters, J.
Environ. Manage. 325 (2023) 116424.
<https://doi.org/https://doi.org/10.1016/j.jenvman.2022.116424>.