Supporting Information

Efficient Iodine Capture from Water Using a Functionalized Covalent Organic Framework

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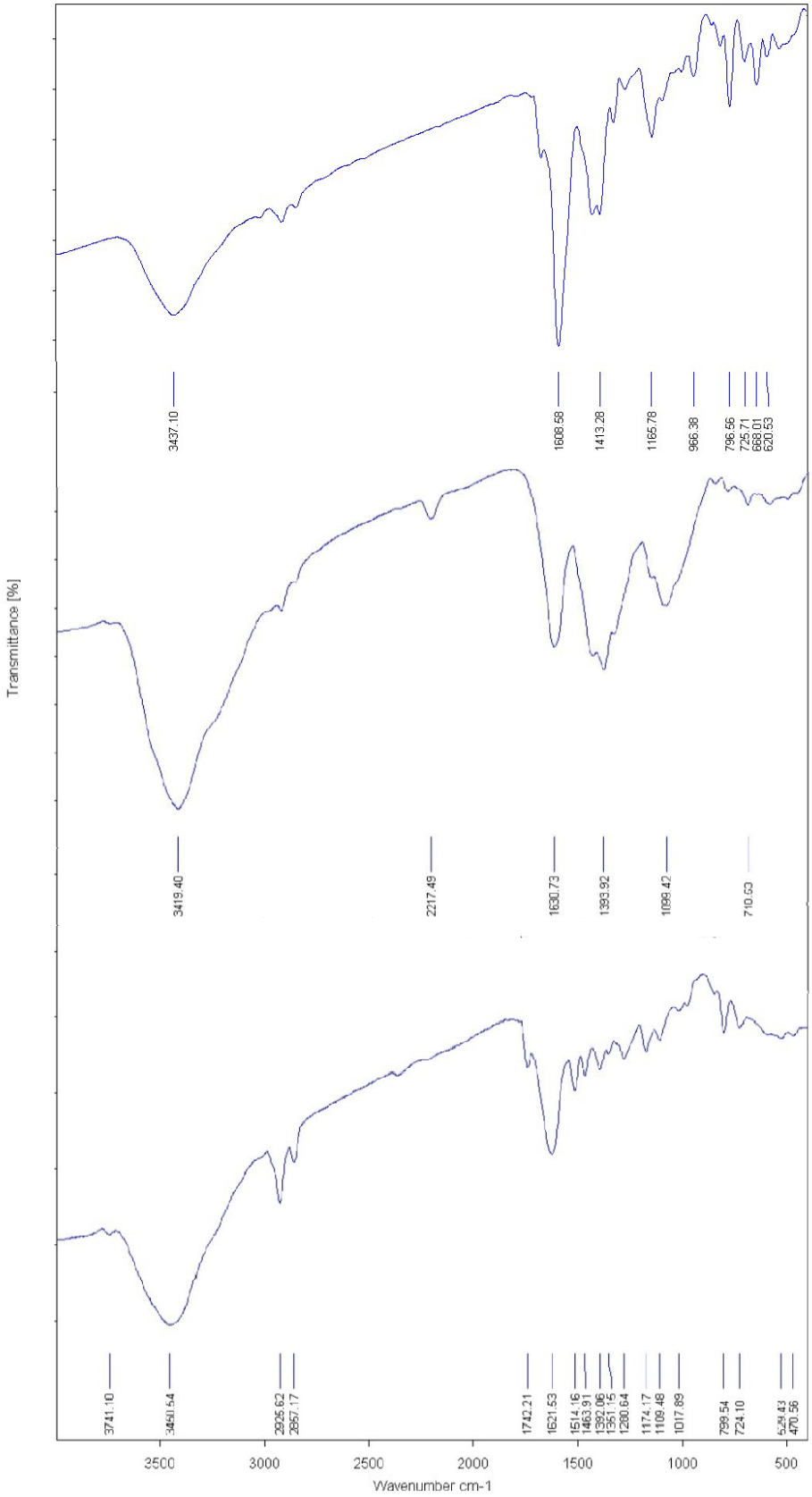
Instruments

PerkinElmer Spectrum spectrometer (Version 10.01.00) with KBr pellet preparation was used to acquire Fourier-transform infrared (FT-IR) spectra. Diffraction analysis was carried out using a Philips X'Pert diffractometer (Cu Kα radiation, λ = 1.5406 Å). To determine the elemental composition of the samples, energy-dispersive X-ray spectroscopy (EDX) was employed using a TESCAN MIRA3 field-emission scanning electron microscope (FE-SEM). UV-Vis absorption measurements were conducted on an Agilent 8453 spectrophotometer at λ = 458 nm to monitor iodine concentration in the supernatant solution over time. The thermal stability of the samples was evaluated by thermogravimetric analysis (TGA) using a Mettler Toledo TGA/DSC instrument. Measurements were conducted from ambient temperature to 700 °C under air constant heating rate of 10 °C/min. Nitrogen physisorption measurements were performed at 77 K using a Micromeritics TriStar II Plus surface area and porosity analyzer. Prior to analysis, the samples were degassed under vacuum at 120 °C for 12 hours. Raman spectra were collected using an RM2000 confocal Raman spectrometer.


Transmittance [%]
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1608.58
1413.28
1165.78
966.38
796.56
725.71
668.01
620.53
3419.40
2217.49
1630.73
1393.92
1099.42
710.53
3741.10
3450.54
2925.62
2857.17
1742.21
1621.53
1514.16
1463.91
1392.06
1351.15
1280.64
1174.17
1109.48
1017.89
799.54
724.10
529.43
470.56
3500
3000
2500
2000
1500
1000
500
Wavenumber cm-1

Figure S1. Comparative FT-IR spectra: COF-366 (top), COF-366-CN (middle), and POP-AO (bottom).

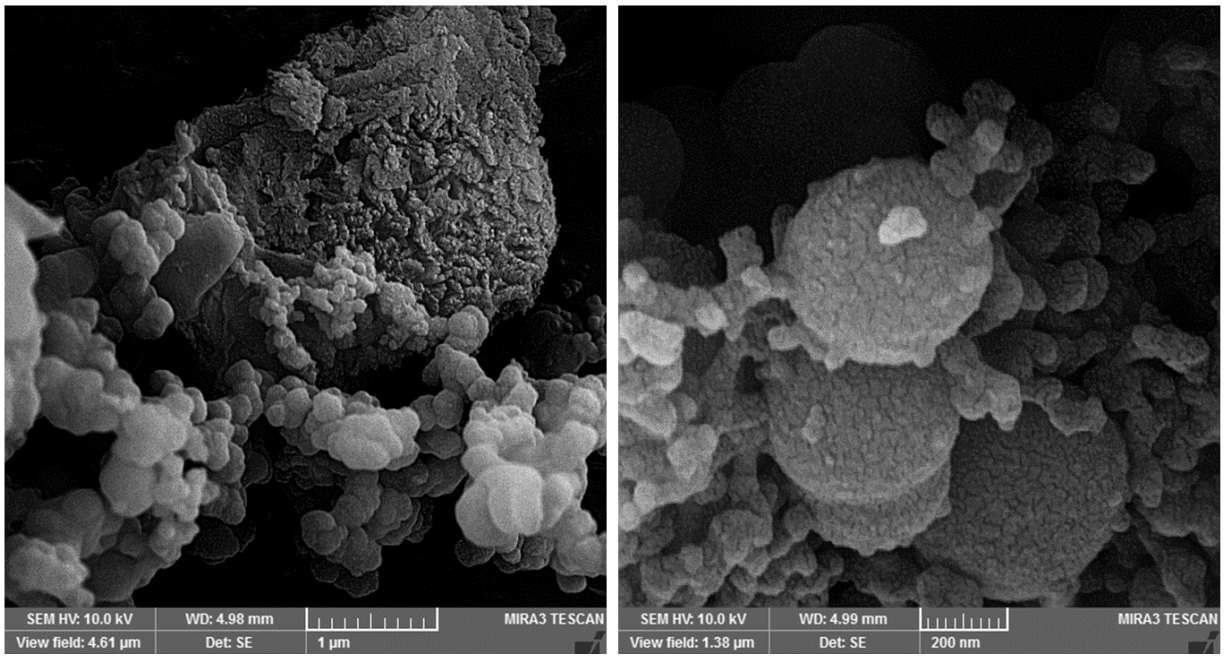

Figure S2. SEM images of COF-366 at different magnifications.

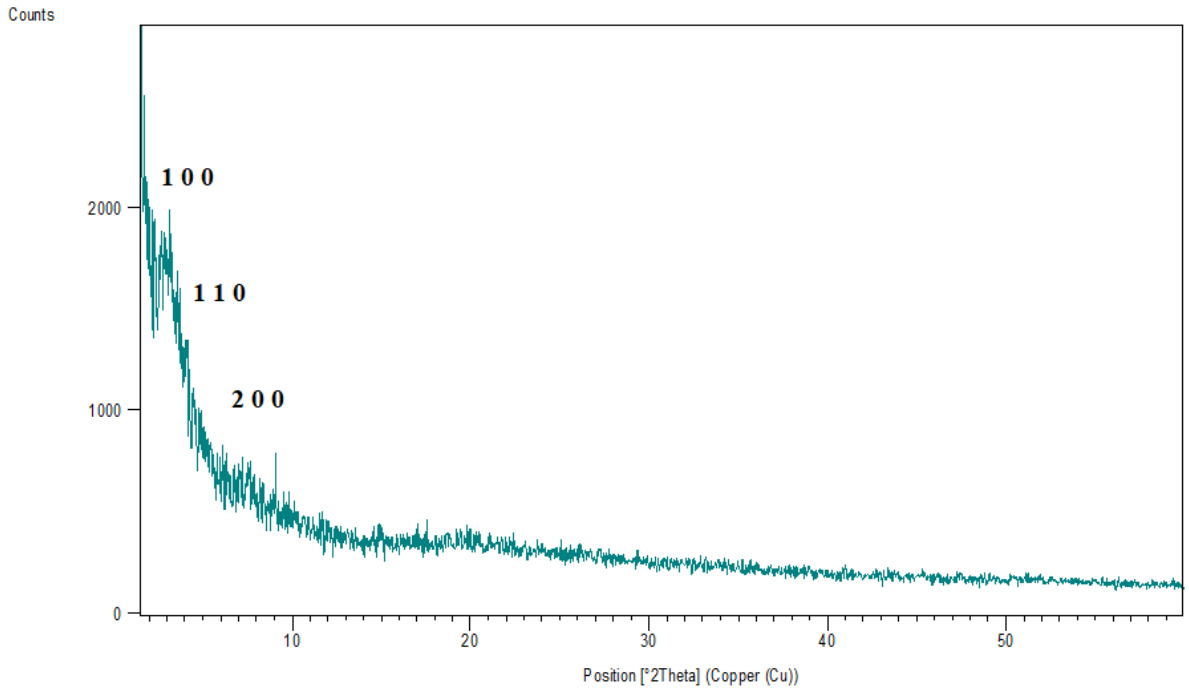

Figure S3. XRD pattern of COF-366.

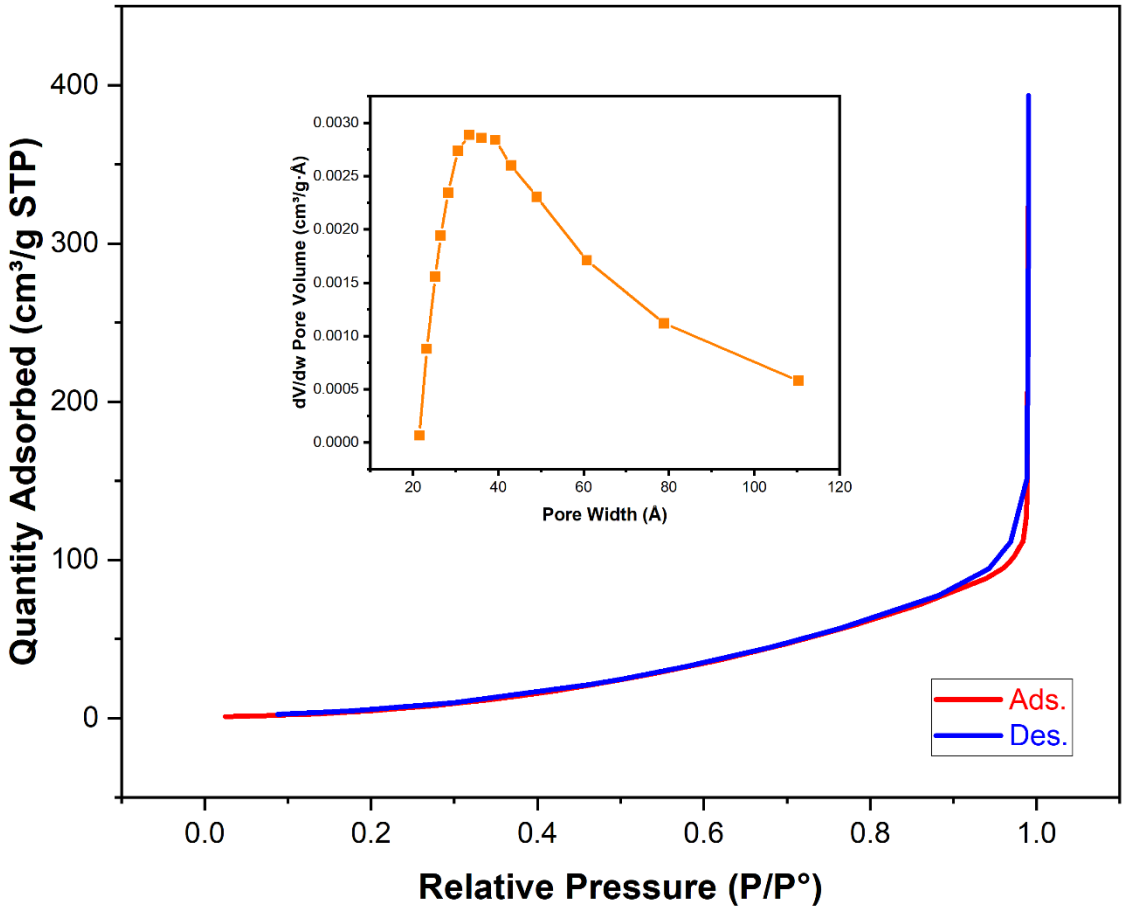

Figure S4. Nitrogen adsorption-desorption isotherm for POP-AO; the corresponding pore size distribution plot is shown in the inset.

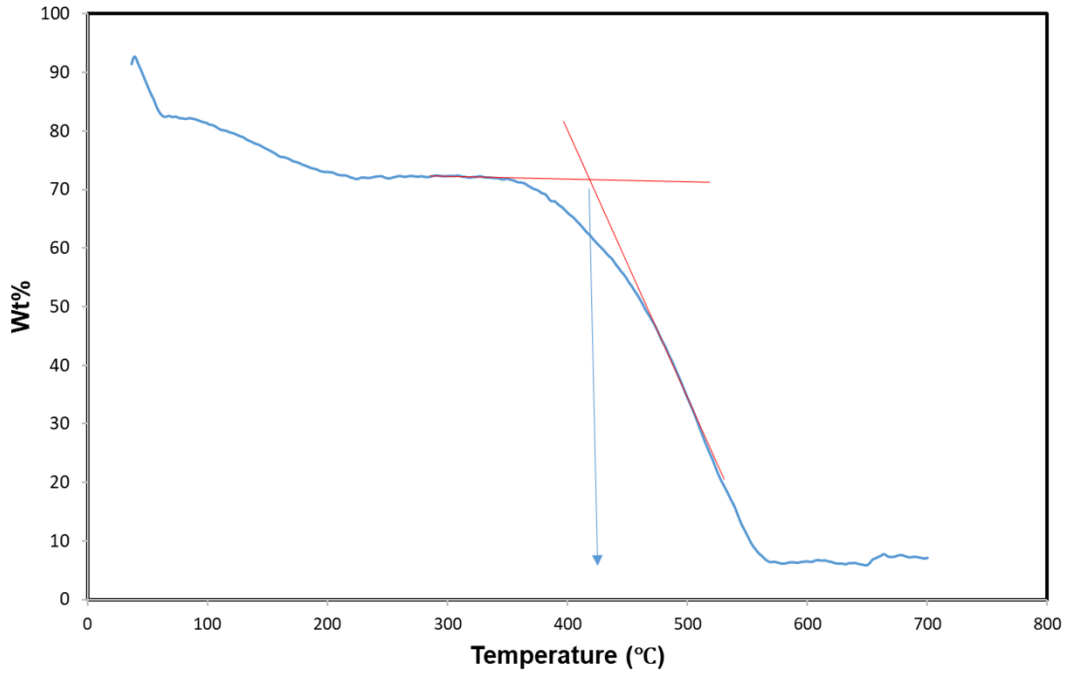

Figure S5. TGA profile for POP-AO, showing mass loss as a function of temperature.

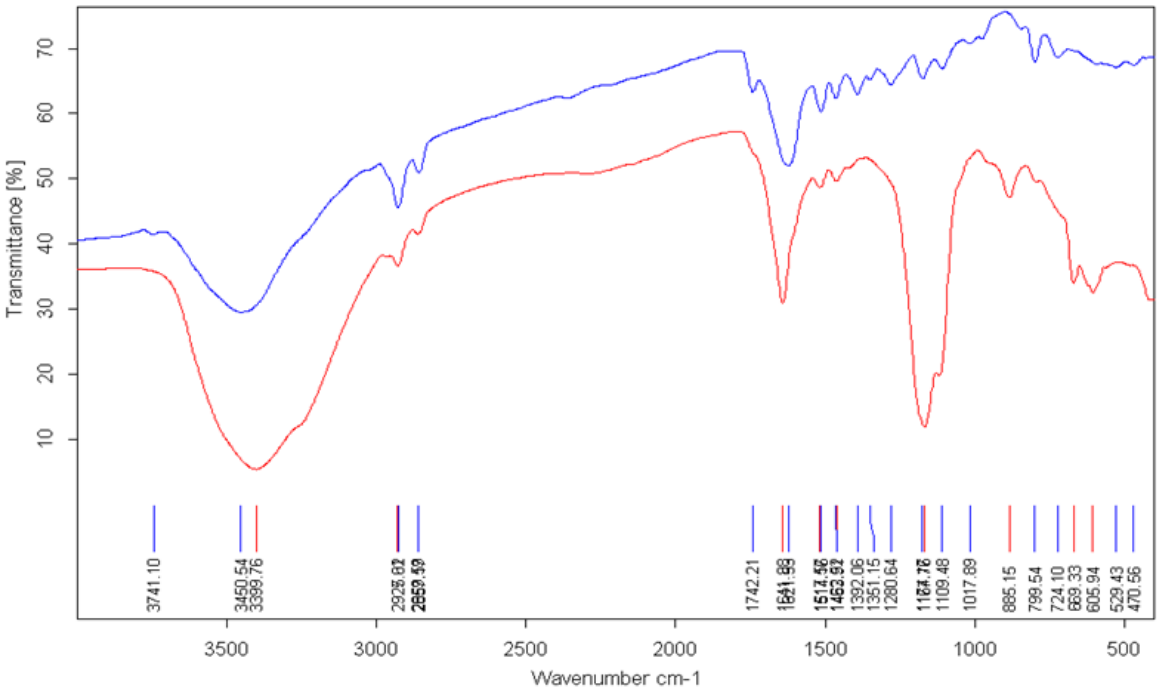

Figure S6. FT-IR spectra of POP-AO (top, blue) and POP-AO-I_2 (bottom, red).

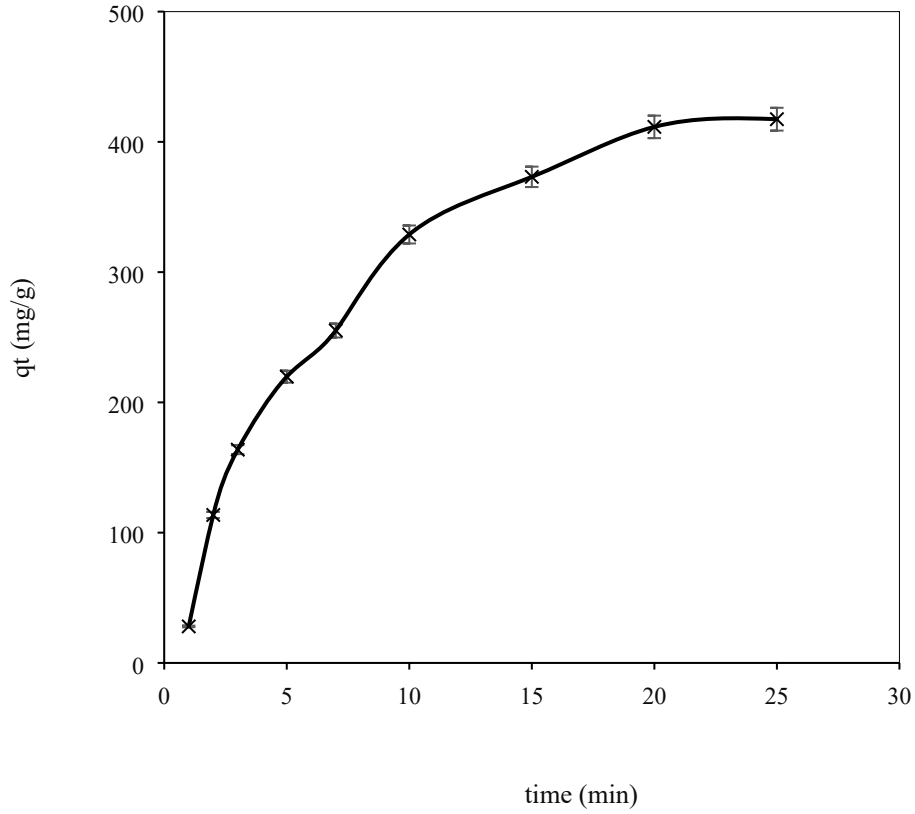

Figure S7. The effect of time on the q_t (RSD% =2.1)

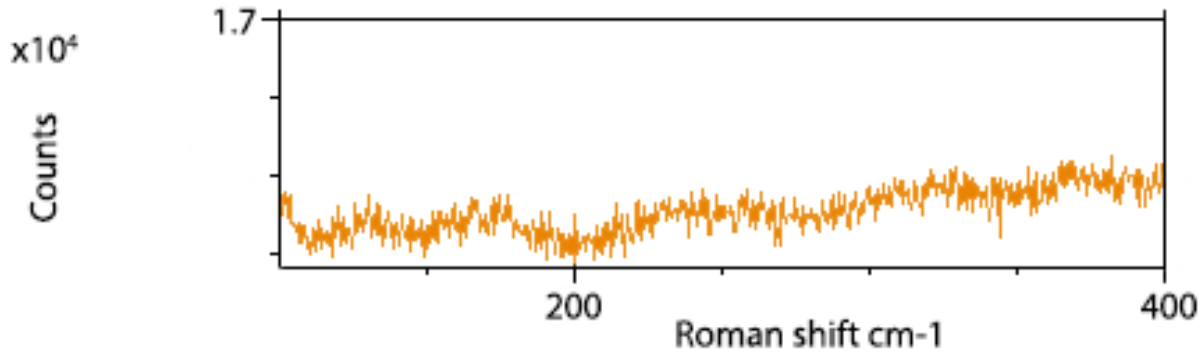

Figure S8. Raman spectra of POP-AO after iodine adsorption.

Table S1. Optimization of desorption conditions for iodine from adsorbent.

NaCl Concentration (mol/L)	Desorption time (h)	Desorption Efficiency (%)
0.5	0.5	69.3
0.5	1.0	76.5
0.5	1.5	84.2
0.5	2.0	88.6
0.5	3.0	89.1
1.0	0.5	81.4
1.0	1.0	90.3
1.0	1.5	94.1
1.0	2.0	95.8
1.0	3.0	95.9
1.5	0.5	84.1
1.5	1.0	91.6
1.5	1.5	94.5
1.5	2.0	95.8
1.5	3.0	96.1