A machine-learning framework for interpretable prediction of cellulose degree of polymerization retention in green solvents

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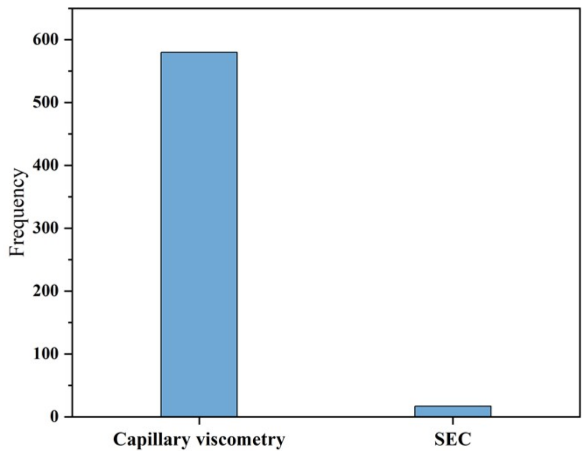

Fig. S1 Frequency distribution of analytical methods for DP determination in the dataset

Table S1 Categories and encodings of raw materials and solvents in the dataset

Features	Category
Raw material	Softwood (1) Industrial cellulose (2) Waste (3) Cotton (4) Hardwood (5) Wood (unspecified type) (6) Recycling paper or textiles (7)
Solvent	BTMAC+FA (1) ChOH+Amine (2) TMAH·5H_2O+urea (3) $ZnCl_2$·xH_2O (x≤3)+FA (4) $ZnCl_2$·xH_2O (x≤3)+PA (5) $ZnCl_2$·xH_2O (x>3)+PA (6)

	ChCl +Amine (7)
	ChCl +Alcohol (8)
	ChCl +Acid (9)
	[P_{4444}][Ac] (10)
	[A_2mim] [CH_3OCH_2COO] (11)
	[Amim] [Cl] (12)
	[Amim] [Cl]+Salt (13)
	[Amim] [(CH_3O)PHO_2] (14)
	[Bmim] [Cl] (15)
	DBU/DBN+ Aspartic Acid/Proline (16)
	DBU/DBN+acid (17)
	[Emim] [Ac] (18)
	[Emim] [Cl] (19)
	[Emim] [DEP] (20)
	[Emim] [DEP]+ metal ion (21)
	[Emim] [DEP]+H_2O (22)
	[Emim] [Oph] (23)
	[$HOOC_4$mim] [Cl] (24)
	TMG+ propionic acid (25)
	$Ca(SCN)_2\cdot 3H_2O$ (26)
	$Ca(SCN)_2\cdot 6H_2O$ (27)
	$Ca(SCN)_2\cdot 7H_2O$ (28)
	$Ca(SCN)_2\cdot 8H_2O$ (29)
	$FeCl_3\cdot 6H_2O$ (30)
	$LiBr\cdot 3H_2O$ (31)
	$LiBr\cdot 4H_2O$ (32)
	$ZnBr_2\cdot 3H_2O$ (33)
	$ZnBr_2\cdot 4H_2O$ (34)
	$ZnBr_2\cdot 5H_2O$ (35)
	$ZnCl_2\cdot 3H_2O$ (36)
	$ZnCl_2\cdot 4H_2O$ (37)

BTMAC: benzyl trimethylammonium chloride; ChOH: choline hydroxide; TMAH: tetramethylammonium hydroxide; [P_{4444}][Ac]: tetra(n-butyl)phosphonium acetate; A_2mim: 1,3-diallylimidazolium cation; Amim: 1-allyl-3-methylimidazolium cation; Bmim: 1-butyl-3-methylimidazolium cation; DBU: 1,8-diazabicyclo[5.4.0]undec-7-ene; DBN: 1,5-Diazabicyclo[4.3.0]non-5-ene; Emim: 1-ethyl-3-methylimidazolium cation; TMG: 1,1,3,3-tetramethylguanidine.

Table S2 Statistical distributions of continuous variables and target variable before and after Yeo-Johnson transformation

	mean	**std**	**min**	**25%**	**50%**	**75%**	**max**	**median**	**Skew**	**Skew_YJ**
DP_0	639.11	684.09	124.00	220.00	300.00	900.00	4135.00	300.00	**2.85**	**0.14**
CrI_0	71.10	8.55	32.90	68.00	72.10	75.00	95.00	72.10	-0.78	
Temp	89.30	30.75	10.00	80.00	90.00	110.00	150.00	90.00	-0.79	
Time	646.17	1103.51	3.00	60.00	180.00	600.00	7200.00	180.00	**2.48**	**0.01**
CC	4.92	3.12	0.20	4.00	4.00	5.00	22.48	4.00	**1.91**	**0.00**
Cation_ESPmax	6.46	2.55	4.66	5.23	5.26	5.50	17.61	5.26	**2.15**	**0.89**
Cation_Balaban J	2.46	0.67	1.00	2.14	2.22	2.32	5.84	2.22	**2.31**	**-0.36**
Cation_TPSA	26.31	33.40	0.00	8.81	8.81	20.23	171.2	8.81	**1.97**	**-0.01**
Cation_PSA	169.44	43.05	57.42	157.79	167.84	181.51	377.42	167.84	**2.40**	**0.07**
Cation_Polar	75.04	32.40	11.59	67.37	76.84	89.40	211.08	76.84	**1.37**	**0.12**
Cation_Sphericity	0.84	0.03	0.72	0.83	0.84	0.84	0.96	0.84	-0.46	
Anion_NSA	117.54	57.34	56.19	68.89	74.64	195.13	195.13	74.64	0.51	
Other_Vdw	38.67	25.21	29.56	29.56	29.56	29.56	217.97	29.56	**3.39**	**2.03**
Other_HOMO	-0.32	0.01	-0.32	-0.32	-0.32	-0.32	-0.21	-0.32	**4.63**	**2.29**
Other_NSA	27.22	11.29	22.93	22.93	22.93	22.93	89.85	22.93	**2.66**	**0.00**
Other_NBO(H+)	0.46	0.02	0.40	0.46	0.46	0.46	0.51	0.46	0.081	
DPR	63.82	31.17	0	45.27	72.56	90.33	100	72.56	-0.79	

Table S3 The hyperparameter search range and optimal hyperparameters of Group 1 model

Model	Hyperparameters	Best Hyperparameters
Histogram Gradient Boosting (HGB)	'learning_rate': (0.01, 0.2)	'learning_rate': (0.1892)
	'max_iter': (100, 300)	'max_iter': (289)
	'max_depth': (3, 20)	'max_depth': (9)
	'min_samples_leaf': (2, 10)	'min_samples_leaf': (2)
	'l2_regularization': (1, 10)	'l2_regularization': (7)
CatBoost	'learning_rate': (0.01, 0.2)	'learning_rate': (0.1622)
	'iterations': (100, 200)	'iterations': (146)
	'depth': (3, 16)	'depth': (7)
	'l2_leaf_reg': (1, 10)	'l2_leaf_reg': (3)
Random Forest (RF)	'n_estimators': (100, 200)	'n_estimators': (170)
	'max_depth': (3, 20)	'max_depth': (15)
	'min_samples_split': (2, 10)	'min_samples_split': (2)
	'min_samples_leaf': (1, 10)	'min_samples_leaf': (1)
Light Gradient Boosting Machine (LGBM)	'learning_rate': (0.01, 0.2)	'learning_rate': (0.1544)
	'n_estimators': (100, 300)	'n_estimators': (291)
	'max_depth': (3, 16)	'max_depth': (8)
	'num_leaves': (10, 30)	'num_leaves': (10)
	'min_child_samples': (1, 10)	'min_child_samples': (2)
XGBoost	'learning_rate': (0.01, 0.2)	'learning_rate': (0.09348)
	'n_estimators': (100, 300)	'n_estimators': (150)
	'max_depth': (3, 20)	'max_depth': (7)
	'subsample': (0.6, 0.4)	'subsample': (0.7078)
	'colsample_bytree': (0.6, 0.4)	'colsample_bytree': (0.8043)
Gradient Boosting Regression (GBR)	'learning_rate': (0.01, 0.2)	'learning_rate': (0.2025)
	'n_estimators': (100, 200)	'n_estimators': (155)
	'max_depth': (3, 20)	'max_depth': (9)
	'min_samples_split': (2, 10)	'min_samples_split': (4)
	'min_samples_leaf': (1, 10)	'min_samples_leaf': (2)
	'subsample': (0.6, 0.4)	'subsample': (0.6148)

Table S4 The hyperparameter search range and optimal hyperparameters of Group 5 model

Model	Hyperparameters	Best Hyperparameters
Histogram Gradient Boosting (HGB)	'learning_rate': (0.01, 0.2)	'learning_rate': (0.08951)
	'max_iter': (100, 300)	'max_iter': (181)
	'max_depth': (3, 20)	'max_depth': (9)
	'min_samples_leaf': (2, 10)	'min_samples_leaf': (9)
	'l2_regularization': (1, 10)	'l2_regularization': (1)
CatBoost	'learning_rate': (0.01, 0.2)	'learning_rate': (0.09847)
	'iterations': (100, 200)	'iterations': (100)
	'depth': (3, 16)	'depth': (14)
	'l2_leaf_reg': (1, 10)	'l2_leaf_reg': (1)
Random Forest (RF)	'n_estimators': (100, 200)	'n_estimators': (170)
	'max_depth': (3, 20)	'max_depth': (15)
	'min_samples_split': (2, 10)	'min_samples_split': (2)
	'min_samples_leaf': (1, 10)	'min_samples_leaf': (1)
Light Gradient Boosting Machine (LGBM)	'learning_rate': (0.01, 0.2)	'learning_rate': (0.09779)
	'n_estimators': (100, 300)	'n_estimators': (216)
	'max_depth': (3, 16)	'max_depth': (9)
	'num_leaves': (10, 30)	'num_leaves': (18)
	'min_child_samples': (1, 10)	'min_child_samples': (5)
XGBoost	'learning_rate': (0.01, 0.2)	'learning_rate': (0.02824)
	'n_estimators': (100, 300)	'n_estimators': (285)
	'max_depth': (3, 20)	'max_depth': (12)
	'subsample': (0.6, 0.4)	'subsample': (0.6230)
	'colsample_bytree': (0.6, 0.4)	'colsample_bytree': (0.9158)
Gradient Boosting Regression (GBR)	'learning_rate': (0.01, 0.2)	'learning_rate': (0.1962)
	'n_estimators': (100, 200)	'n_estimators': (112)
	'max_depth': (3, 20)	'max_depth': (7)
	'min_samples_split': (2, 10)	'min_samples_split': (8)
	'min_samples_leaf': (1, 10)	'min_samples_leaf': (1)
	'subsample': (0.6, 0.4)	'subsample': (0.6148)

Table S5 Comparison of model prediction results before and after data transformation based on Group 5 RF

	Model	Before transformation	After transformation
Test R^2	HGB	0.9421	0.9421
	CatBoost	0.9517	0.9471
	RF	0.9555	0.9547
	LGBM	0.9451	0.9467
	XGBoost	0.9433	0.9428
	GBR	0.9430	0.9546
Test RMSE	HGB	7.4649	7.4649
	CatBoost	6.8202	7.1333
	RF	6.5407	6.5990
	LGBM	7.2703	7.1589
	XGBoost	7.3830	7.4202
	GBR	7.4038	6.6114
Test MAE	HGB	5.0399	5.0399
	CatBoost	4.6618	4.7635
	RF	4.4278	4.4226
	LGBM	4.6019	4.5345
	XGBoost	4.6535	4.6808
	GBR	4.7551	4.1385

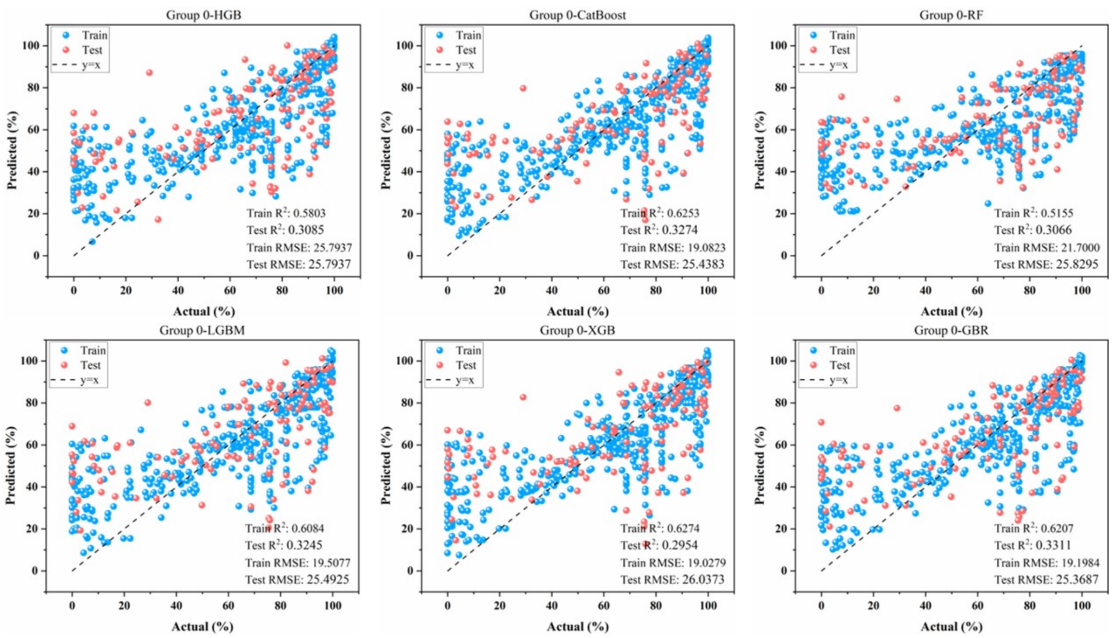

Fig. S2 prediction results of Group 0 based on six algorithms.

Table S6 Comparison of model performance across feature groups after feature importance-based selection

Groups	Number of full features	Number of simplified features	Test R^2 (full)	Test R^2 (simplified)	Test R^2 (original PCA)
Group 1	**6**	**5**	**0.9480**	**0.9240**	**0.9480**
Group 2	25	9	0.9370	0.9439	0.9420
Group 3	14	8	0.8687	0.8755	0.8693
Group 4	27	9	0.9245	0.9292	0.9358
Group 5	37	17	0.9523	0.9539	0.9555
Group 5	**37**	**12**	**0.9523**	**0.9526**	**0.9555**
Group 5	37	11	0.9523	0.9489	0.9555
Group 6	45	9	0.9381	0.9369	0.9493

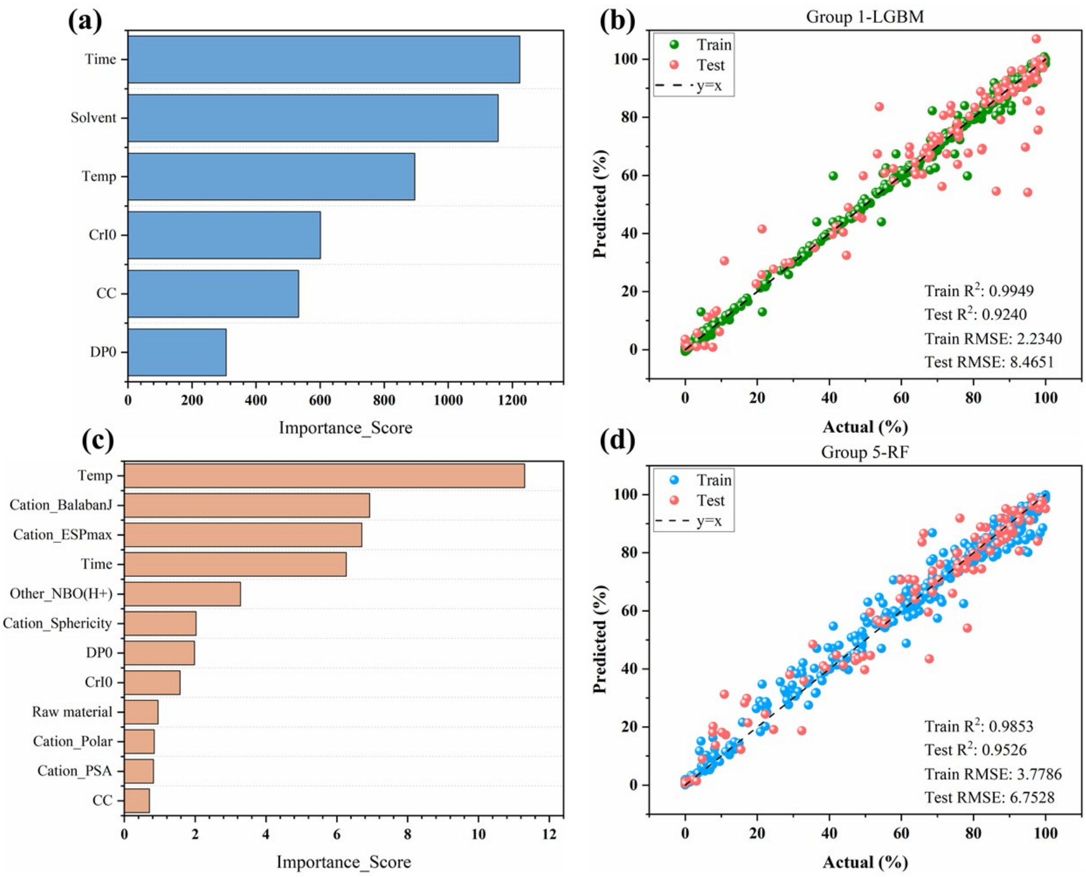

Fig. S3. Feature selection results based on feature importance for Group 1 (LGBM) and Group 5 (RF): (a, c) importance rankings; (b, d) prediction scatter plots.

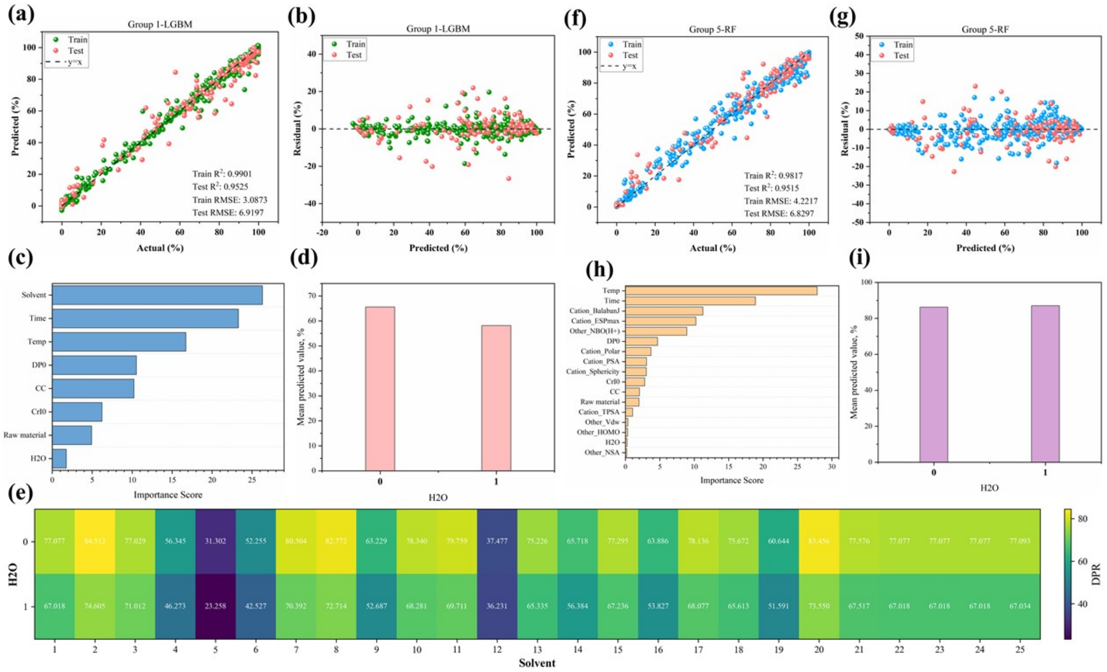

Fig. S4 Interpretable analysis of water effects on cellulose DPR: (a–c) Group 1-LGBM (prediction, residuals, feature importance); (d) H_2O PDP; (e) Solvent–H_2O interaction; (f–i) Group 5-RF (prediction, residuals, feature importance, H_2O PDP).

Table S7 Sensitivity analysis of model performance upon exclusion of each solvent category

Group	R^2	RMSE	MAE
Excluding DES	0.9657	5.7427	3.9337
Excluding IL	0.9082	9.9334	7.3216
Excluding MSH	0.9646	6.0933	4.3208

Table S8 Predicted vs. actual DPR from the solvent-category-based model (Group 1-LGBM)

Raw material	DP0	CrI0	Solvent	Temp	Time	CC	Actual	Predicted	Residual	DOI
6	1355	60.7	1	130	20	11	92.99	92.15	0.84	10.1016/j.ijbiomac.2025.146079
6	1355	60.7	1	130	40	11	89.96	91.67	-1.71	10.1016/j.ijbiomac.2025.146079
6	1355	60.7	1	130	60	11	92.62	90.96	1.66	10.1016/j.ijbiomac.2025.146079
6	1468	60.7	1	110	50	11	87.19	87.68	-0.48	10.1016/j.ijbiomac.2025.146079
6	1468	60.7	1	120	50	11	91.62	92.16	-0.54	10.1016/j.ijbiomac.2025.146079
6	1468	60.7	1	130	50	11	85.76	85.85	-0.08	10.1016/j.ijbiomac.2025.146079
4	1260	70	12	80	60	8	51.59	62.98	-11.40	10.1007/s10570-015-0733-9
4	1260	70	12	90	60	8	49.21	69.10	-19.89	10.1007/s10570-015-0733-9
4	1260	70	12	100	60	8	44.21	43.96	0.25	10.1007/s10570-015-0733-9
4	1260	70	12	110	60	8	34.44	32.87	1.57	10.1007/s10570-015-0733-9
4	1260	70	12	120	60	8	24.68	22.58	2.10	10.1007/s10570-015-0733-9
4	1260	70	12	130	60	8	22.22	18.44	3.78	10.1007/s10570-015-0733-9
4	1260	70	12	100	60	8	43.65	43.96	-0.31	10.1007/s10570-015-0733-9
4	1260	70	12	100	60	8	43.25	43.96	-0.70	10.1007/s10570-015-0733-9
4	1260	70	12	100	120	8	42.06	38.49	3.57	10.1007/s10570-015-0733-9
4	1260	70	12	100	180	8	40.08	37.56	2.52	10.1007/s10570-015-0733-9
4	1260	70	12	100	240	8	37.70	38.28	-0.58	10.1007/s10570-015-0733-9
4	1260	70	12	100	300	8	36.11	35.04	1.07	10.1007/s10570-015-0733-9
4	1260	70	12	100	360	8	35.32	34.23	1.09	10.1007/s10570-015-0733-9
4	1260	70	12	100	420	8	34.92	34.23	0.69	10.1007/s10570-015-0733-9
4	1260	70	12	100	480	8	34.13	34.16	-0.04	10.1007/s10570-015-0733-9
4	1260	70	12	100	60	5	42.46	44.06	-1.60	10.1007/s10570-015-0733-9

4	1260	70	12	100	60	12	44.44	50.85	-6.41	10.1007/s10570-015-0733-9
2	208		12	60	1440	8	97.60	94.19	3.41	10.1515/hf-2015-0116
2	208		12	80	495	8	93.27	89.04	4.23	10.1515/hf-2015-0116
2	208		12	100	36	8	99.52	98.90	0.62	10.1515/hf-2015-0116
2	218	75	12	90	50	7	92.20	88.99	3.21	10.1039/c9gc00334g
2	218	75	12	100	50	7	85.32	90.60	-5.28	10.1039/c9gc00334g
5	4829	60.4	15	100	180	5	60.20	55.07	5.13	10.1016/j.indcrop.2017.02.038
5	4745	61.8	15	100	180	5	30.35	33.70	-3.35	10.1016/j.indcrop.2017.02.038
5	3250	63.2	15	100	180	5	32.09	34.34	-2.25	10.1016/j.indcrop.2017.02.038
4	1260	70	15	80	60	8	51.11	47.45	3.66	10.1007/s10570-015-0733-9
4	1260	70	15	90	60	8	49.21	47.21	2.00	10.1007/s10570-015-0733-9
4	1260	70	15	100	60	8	43.10	44.67	-1.58	10.1007/s10570-015-0733-9
4	1260	70	15	110	60	8	32.94	31.84	1.09	10.1007/s10570-015-0733-9
4	1260	70	15	120	60	8	23.57	26.25	-2.68	10.1007/s10570-015-0733-9
4	1260	70	15	130	60	8	20.24	22.40	-2.16	10.1007/s10570-015-0733-9
3	650		15	100	60	4.8	69.23	68.55	0.68	10.1016/j.gee.2019.12.004
3	1039	45.3	18	90	360	3	50.14	51.78	-1.64	10.1016/j.carbpol.2013.02.059
3	992	46.4	18	90	360	3	51.51	51.78	-0.27	10.1016/j.carbpol.2013.02.059
3	992	46.4	18	90	360	3	51.51	51.78	-0.27	10.1016/j.carbpol.2013.02.059
3	974	47.5	18	90	360	3	52.77	51.82	0.95	10.1016/j.carbpol.2013.02.059
4	920	90	18	25	10	5	56.96	91.65	-34.69	10.1007/s10570-017-1215-z
2	210	70	18	100	180	9	64.76	78.16	-13.39	10.1039/d3cp01757e
5	1026		18	95		10	74.76	75.06	-0.31	10.1016/j.carbpol.2014.09.075
2	4611	72.2	31	130	120	1.64	1.28	2.21	-0.93	10.1016/j.fuproc.2021.106739
2	4611	72.2	31	120	300	1.64	1.87	1.11	0.75	10.1016/j.fuproc.2021.106739
4	582	70	37	25	120	3	76.98	75.97	1.01	10.1016/j.carbpol.2024.122557

4	582	70	37	25	300	3	68.21	66.73	1.48	10.1016/j.carbpol.2024.122557
4	582	70	37	25	600	3	61.51	63.77	-2.26	10.1016/j.carbpol.2024.122557
4	582	70	37	25	1440	3	52.06	50.80	1.27	10.1016/j.carbpol.2024.122557
4	582	70	37	25	2880	3	42.61	44.79	-2.18	10.1016/j.carbpol.2024.122557
2	180		37	25	15	1	71.67	72.82	-1.16	10.1039/d1gc03918k
6	706		37	25	120	1	72.24	72.25	-0.02	10.1039/d1gc03918k
4	4080		37	25	120	1	72.94	70.71	2.23	10.1039/d1gc03918k
4	2016		37	25	120	1	73.61	56.12	17.49	10.1039/d1gc03918k
7	685	72.51	37	60		1.45	47.15	43.08	4.08	10.1016/j.jclepro.2024.142107

Table S9 Predicted vs. actual DPR from the descriptor-based model (Group 5-RF)

Raw material	DP_0	CrI_0	Temp	Time	CC	Cation_ESPmax	Cation_BalabanJ	Cation_PSA	Cation_Polar	Cation_Sphericity	Other_NBO(H+)	Actual	Predicted	Residual
2	4611	72.2	130	120	1.64	8.63	2.32	115.42	23.66	0.81		1.28	9.35	-8.07
2	4611	72.2	120	300	1.64	8.63	2.32	115.42	23.66	0.81		1.87	12.19	-10.32
4	1260	70	130	60	8	5.20	2.06	199.88	99.02	0.84		20.24	29.27	-9.03
4	1260	70	130	60	8	5.23	2.14	181.51	89.40	0.83		22.22	20.74	1.48
4	1260	70	120	60	8	5.20	2.06	199.88	99.02	0.84		23.57	31.45	-7.87
4	1260	70	120	60	8	5.23	2.14	181.51	89.40	0.83		24.68	24.02	0.66
5	4745	61.8	100	180	5	5.20	2.06	199.88	99.02	0.84		30.35	31.21	-0.86
5	3250	63.2	100	180	5	5.20	2.06	199.88	99.02	0.84		32.09	32.34	-0.25
4	1260	70	110	60	8	5.20	2.06	199.88	99.02	0.84		32.94	45.56	-12.62
4	1260	70	100	480	8	5.23	2.14	181.51	89.40	0.83		34.13	33.72	0.41
4	1260	70	110	60	8	5.23	2.14	181.51	89.40	0.83		34.44	37.06	-2.62
4	1260	70	100	420	8	5.23	2.14	181.51	89.40	0.83		34.92	34.59	0.33
4	1260	70	100	360	8	5.23	2.14	181.51	89.40	0.83		35.32	35.07	0.25

4	1260	70	100	300	8	5.23	2.14	181.51	89.40	0.83	36.11	35.66	0.45
4	1260	70	100	240	8	5.23	2.14	181.51	89.40	0.83	37.70	37.36	0.33
4	1260	70	100	180	8	5.23	2.14	181.51	89.40	0.83	40.08	38.92	1.16
4	1260	70	100	120	8	5.23	2.14	181.51	89.40	0.83	42.06	38.79	3.27
4	1260	70	100	60	5	5.23	2.14	181.51	89.40	0.83	42.46	44.40	-1.94
4	582	70	25	2880	3	10.45	3.02	134.55	35.26	0.82	42.61	64.55	-21.94
4	1260	70	100	60	8	5.20	2.06	199.88	99.02	0.84	43.10	46.58	-3.49
4	1260	70	100	60	8	5.23	2.14	181.51	89.40	0.83	43.25	43.82	-0.57
4	1260	70	100	60	8	5.23	2.14	181.51	89.40	0.83	43.65	43.82	-0.17
4	1260	70	100	60	8	5.23	2.14	181.51	89.40	0.83	44.21	43.82	0.39
4	1260	70	100	60	12	5.23	2.14	181.51	89.40	0.83	44.44	44.56	-0.12
7	685	72.51	60		1.45	10.45	3.02	134.55	35.26	0.82	47.15	49.97	-2.82
4	1260	70	90	60	8	5.23	2.14	181.51	89.40	0.83	49.21	53.57	-4.36
4	1260	70	90	60	8	5.20	2.06	199.88	99.02	0.84	49.21	51.67	-2.46
3	1039	45.3	90	360	3	5.26	2.22	167.84	76.84	0.84	50.14	52.79	-2.64
4	1260	70	80	60	8	5.20	2.06	199.88	99.02	0.84	51.11	62.19	-11.08
3	992	46.4	90	360	3	5.26	2.22	167.84	76.84	0.84	51.51	52.26	-0.75
3	992	46.4	90	360	3	5.26	2.22	167.84	76.84	0.84	51.51	52.26	-0.75
4	1260	70	80	60	8	5.23	2.14	181.51	89.40	0.83	51.59	62.67	-11.08
4	582	70	25	1440	3	10.45	3.02	134.55	35.26	0.82	52.06	64.56	-12.50
3	974	47.5	90	360	3	5.26	2.22	167.84	76.84	0.84	52.77	56.06	-3.29
4	920	90	25	10	5	5.26	2.22	167.84	76.84	0.84	56.96	66.98	-10.02
5	4829	60.4	100	180	5	5.20	2.06	199.88	99.02	0.84	60.20	31.21	28.99
4	582	70	25	600	3	10.45	3.02	134.55	35.26	0.82	61.51	65.31	-3.80
2	210	70	100	180	9	5.26	2.22	167.84	76.84	0.84	64.76	70.31	-5.55
4	582	70	25	300	3	10.45	3.02	134.55	35.26	0.82	68.21	69.07	-0.86
3	650		100	60	4.8	5.20	2.06	199.88	99.02	0.84	69.23	73.44	-4.21
2	180		25	15	1	10.45	3.02	134.55	35.26	0.82	71.67	68.86	2.80
6	706		25	120	1	10.45	3.02	134.55	35.26	0.82	72.24	71.02	1.21

4	4080		25	120	1	10.45	3.02	134.55	35.26	0.82		72.94	70.12	2.82
4	2016		25	120	1	10.45	3.02	134.55	35.26	0.82		73.61	72.85	0.76
5	1026		95		10	5.26	2.22	167.84	76.84	0.84		74.76	71.98	2.77
4	582	70	25	120	3	10.45	3.02	134.55	35.26	0.82		76.98	73.24	3.74
2	218	75	100	50	7	5.23	2.14	181.51	89.40	0.83		85.32	81.05	4.27
6	1468	60.7	130	50	11	5.04	2.24	204.94	116.93	0.86	0.47373	85.76	86.46	-0.70
6	1468	60.7	110	50	11	5.04	2.24	204.94	116.93	0.86	0.47373	87.19	85.71	1.48
6	1355	60.7	130	40	11	5.04	2.24	204.94	116.93	0.86	0.47373	89.96	88.75	1.21
6	1468	60.7	120	50	11	5.04	2.24	204.94	116.93	0.86	0.47373	91.62	88.62	3.00
2	218	75	90	50	7	5.23	2.14	181.51	89.40	0.83		92.20	77.68	14.52
6	1355	60.7	130	60	11	5.04	2.24	204.94	116.93	0.86	0.47373	92.62	88.35	4.27
6	1355	60.7	130	20	11	5.04	2.24	204.94	116.93	0.86	0.47373	92.99	89.64	3.34
2	208		80	495	8	5.23	2.14	181.51	89.40	0.83		93.27	87.00	6.27
2	208		60	1440	8	5.23	2.14	181.51	89.40	0.83		97.60	86.16	11.44
2	208		100	36	8	5.23	2.14	181.51	89.40	0.83		99.52	93.34	6.18