Supporting Information

Sustainable recycling of intact carbon fibres from end-of-service-life composites

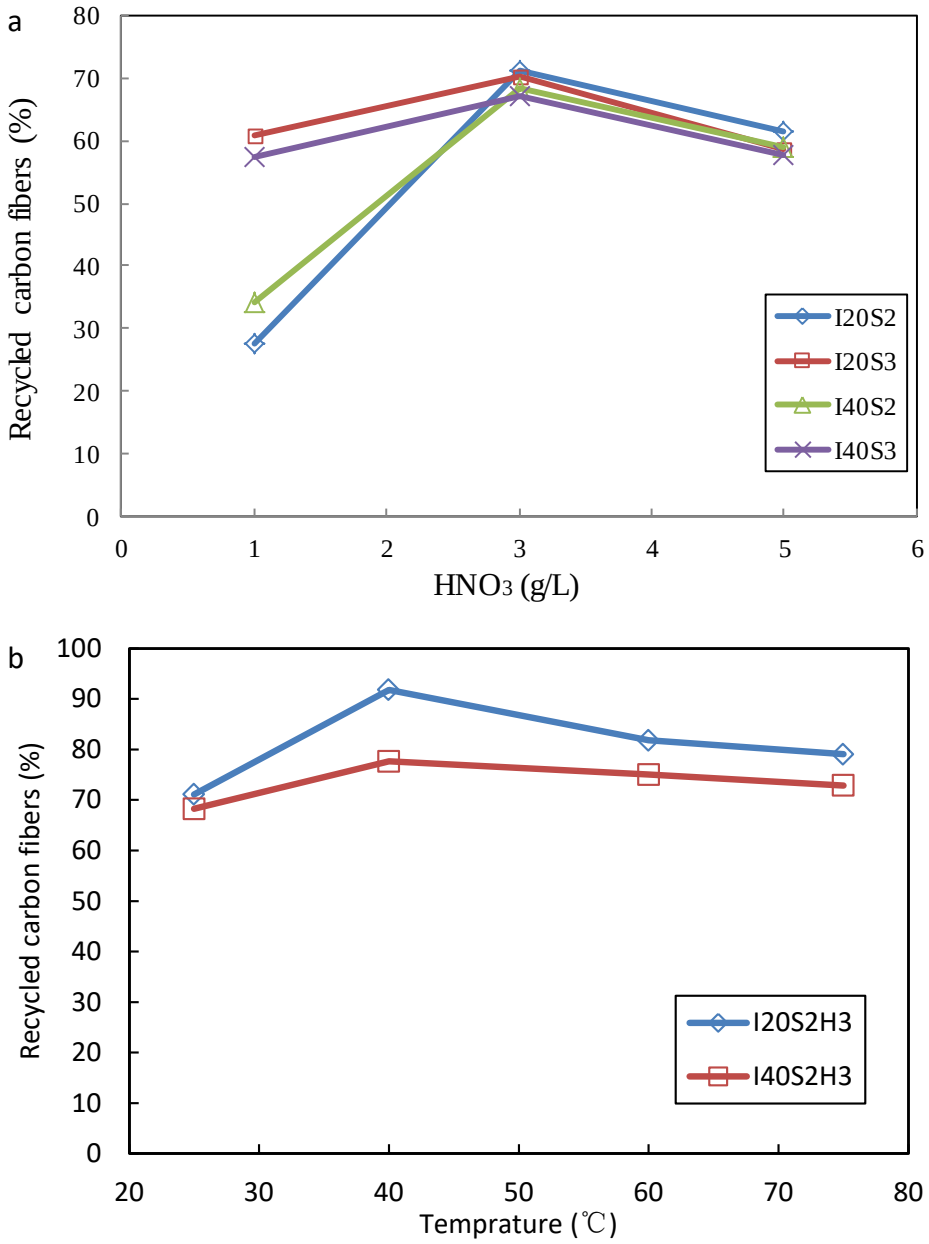


Figure SI 1 Amount of rCFs a. Effect of HNO_3 concentration; b. Effect of temperature.

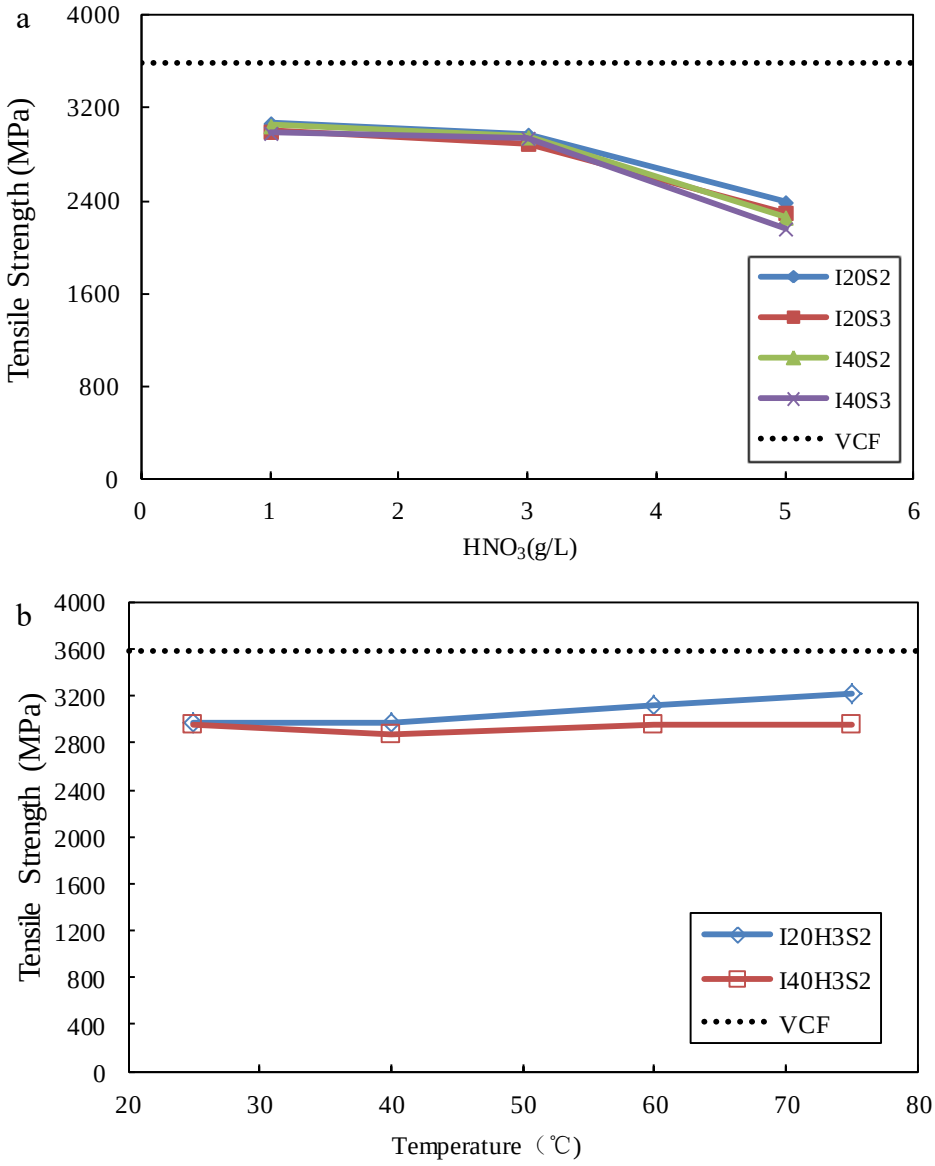


Figure SI 2 Tensile strength of rCFs a. Effect of HNO_3 concentration. b. Effect of temperature.

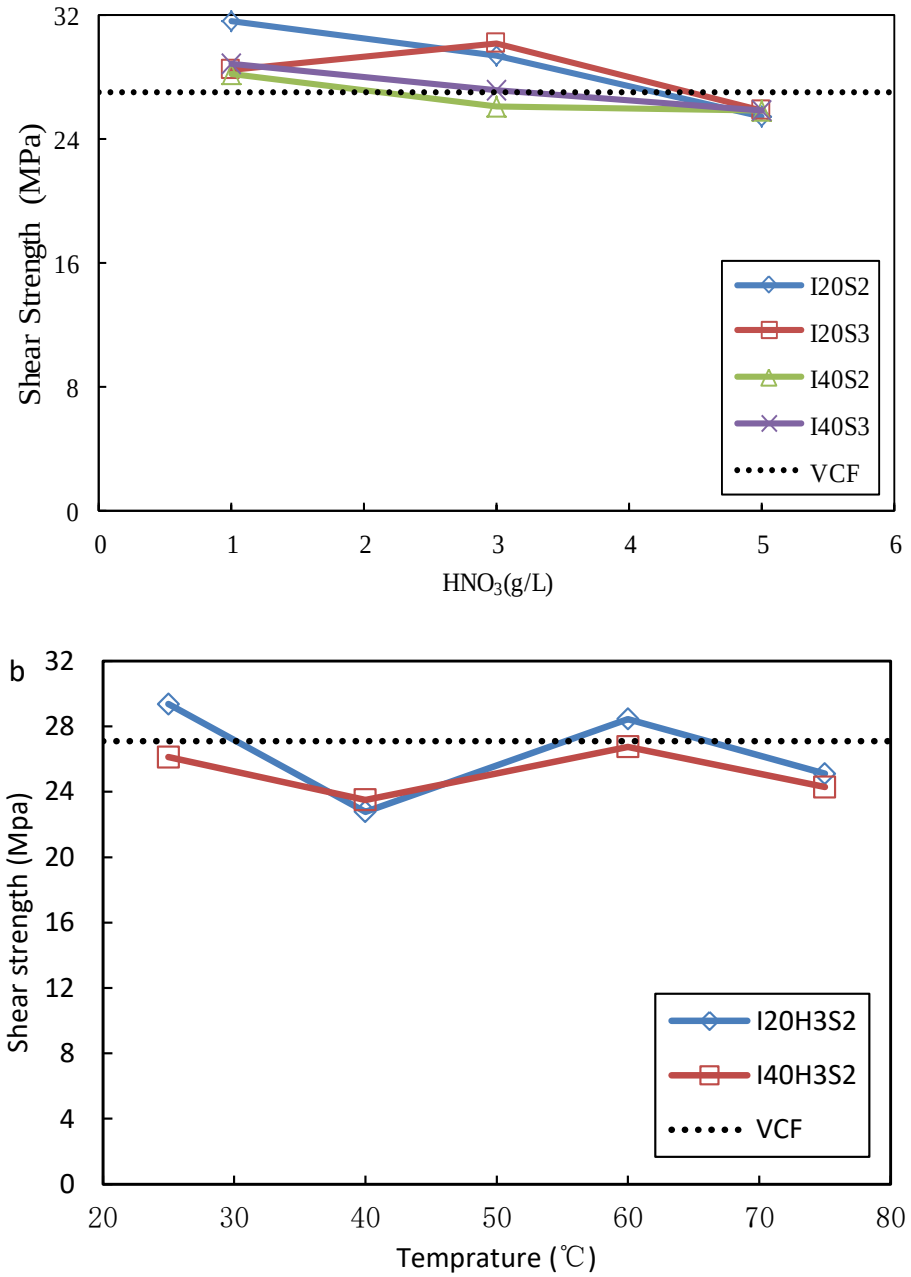
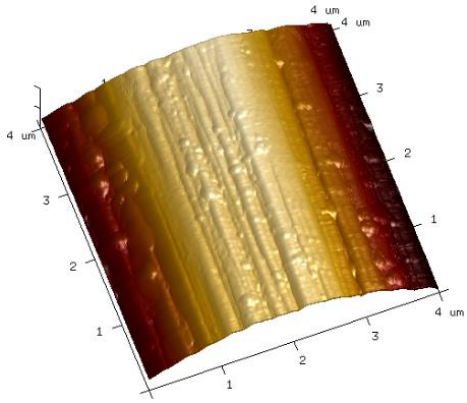
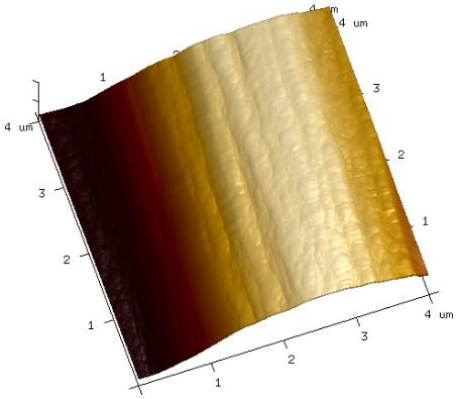


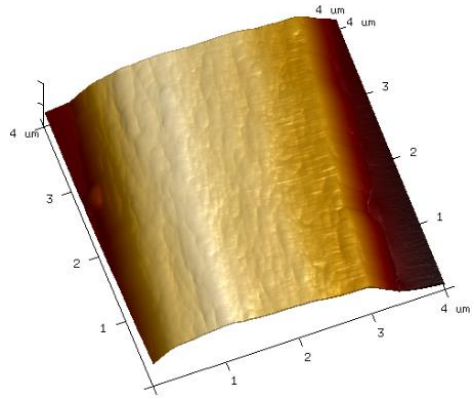
Figure SI 3 Interfacial shear strength of rCFs a. Effect of HNO_3 concentration. b. Effect of temperature.



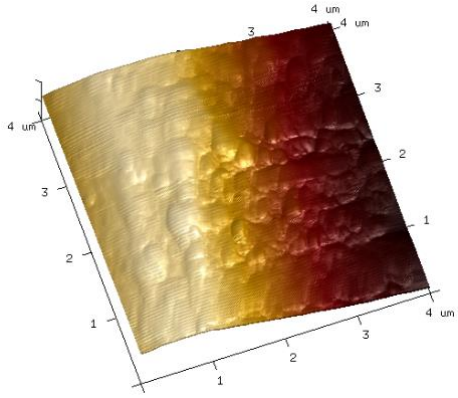
（a）I20S2H1



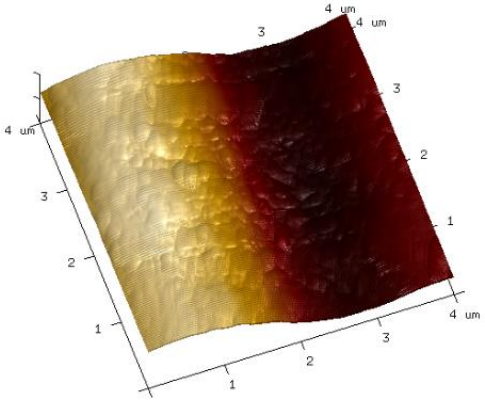
（b）I40S2H1



（c）I40S2H3

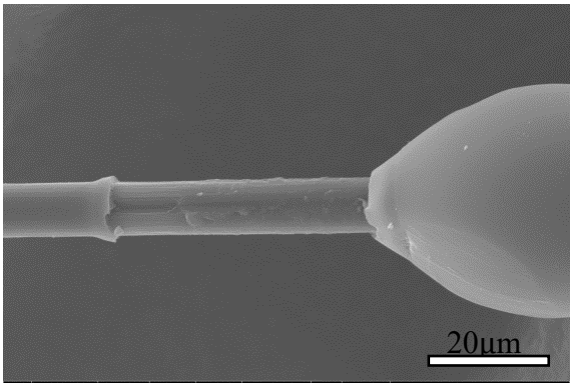


（d）I20S2H5

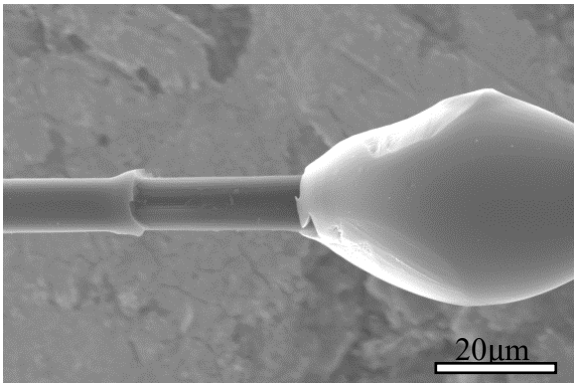


（e）I40S2H5

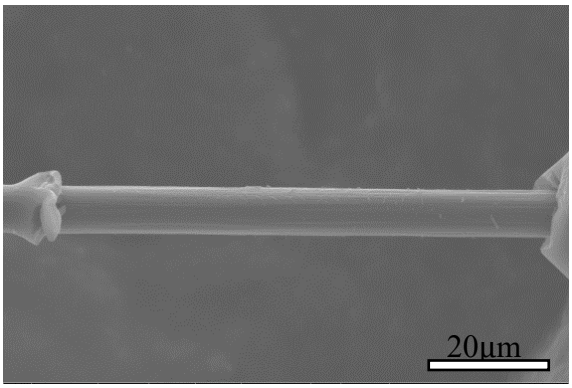
Figure SI 4 AFM morphology images of rCFs



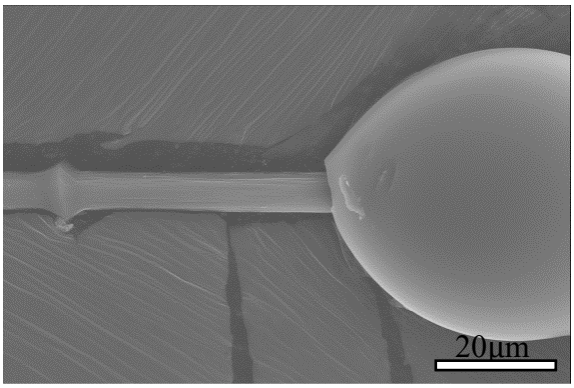
（a）I20S2H1（DB）



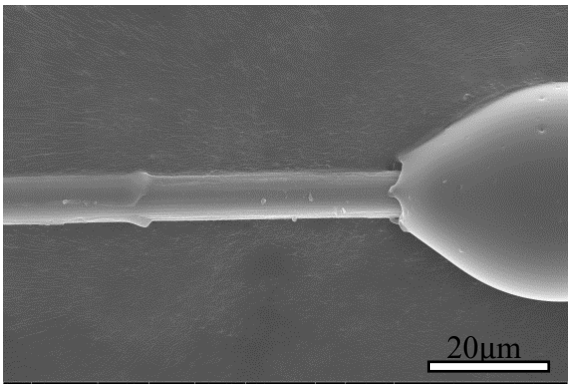
（b）I40S2H1



（c）I20S2H3（CB）

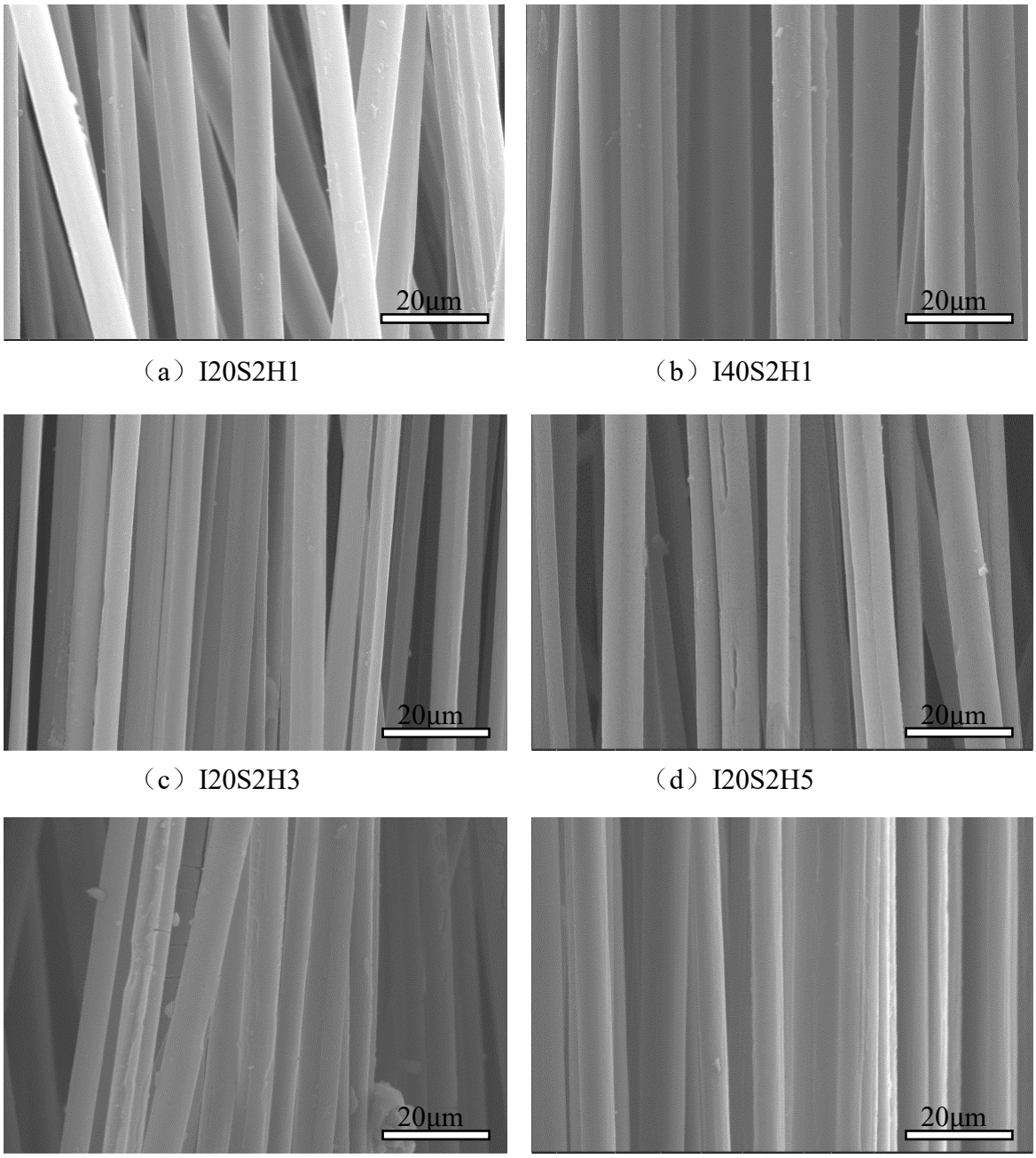


（d）I20S2H5



（e）I40S2H5（EB）

Figure SI 5 Failure modes of IFSS tests

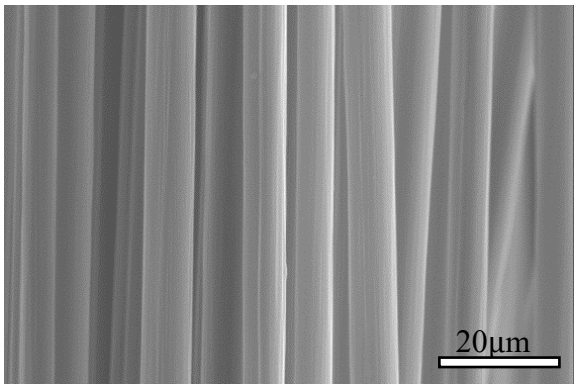


（a）I20S2H1　　（b）I40S2H1

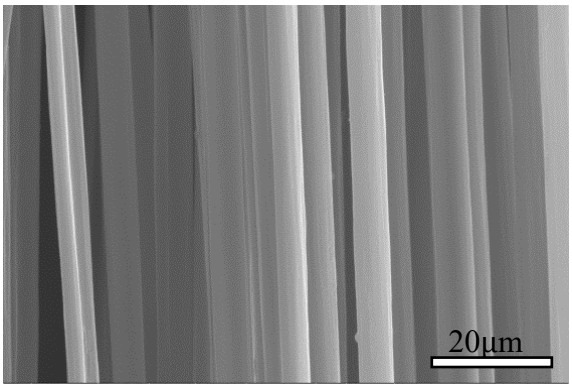
（c）I20S2H3　　（d）I20S2H5

（e）I40S2H5　　（f）I20S2H3T40

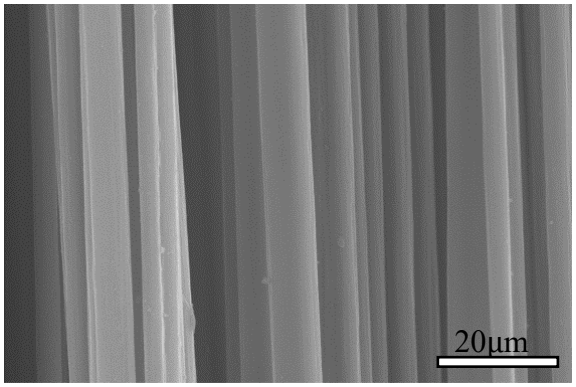
Figure SI 6 SEM morphologies of rCFs



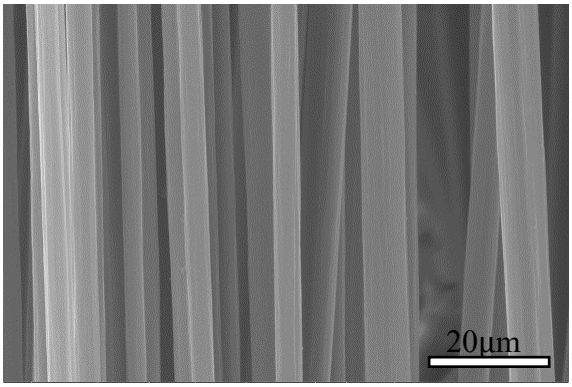
（g）I20S2H3T60



（h）I40S2H3T60



（i）I20S2H3T75



（j）I40S2H3T75

Figure SI 6 Cont.

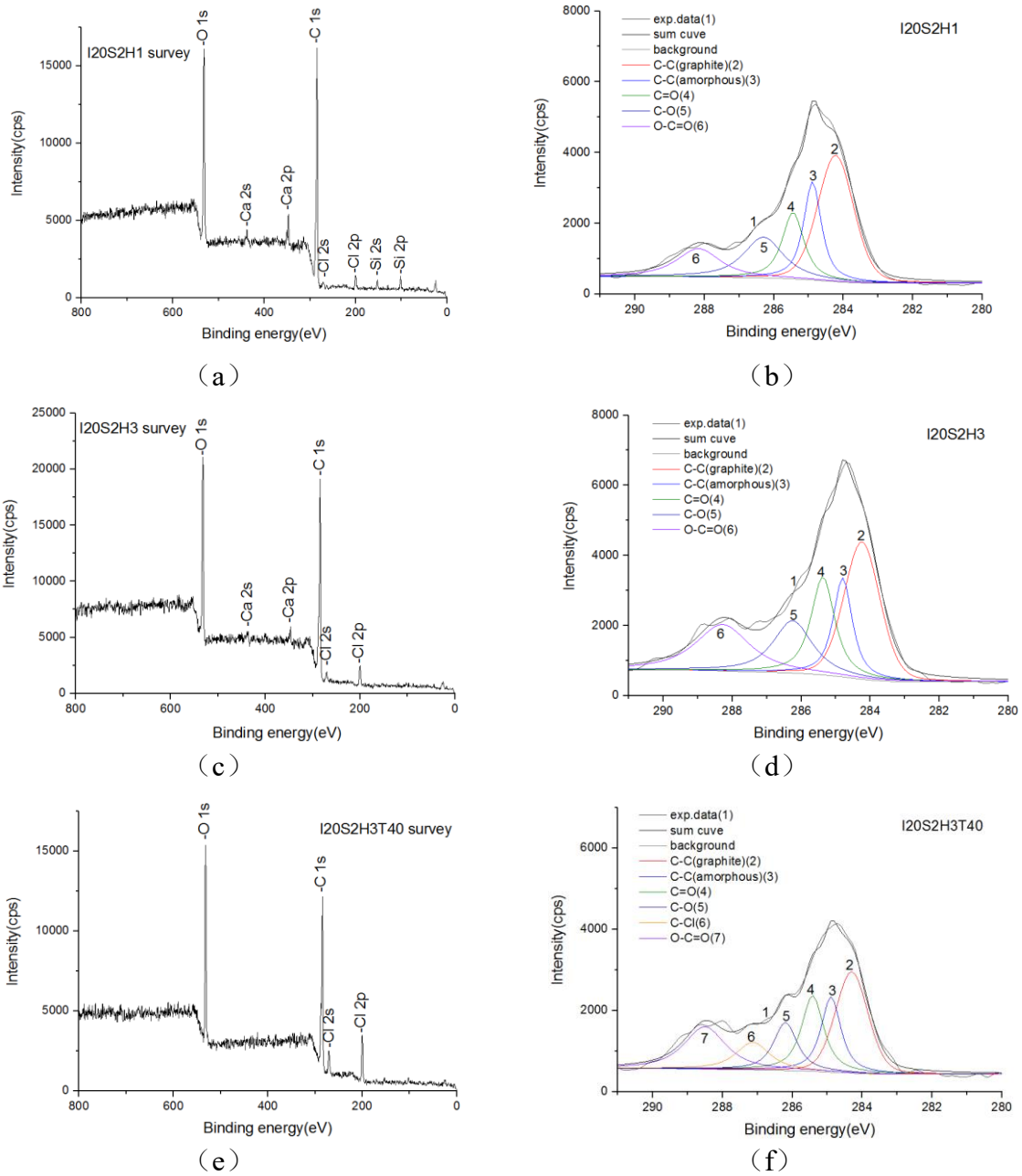


Figure SI 7 Full spectrum and high-resolution narrow spectrum of rCFs

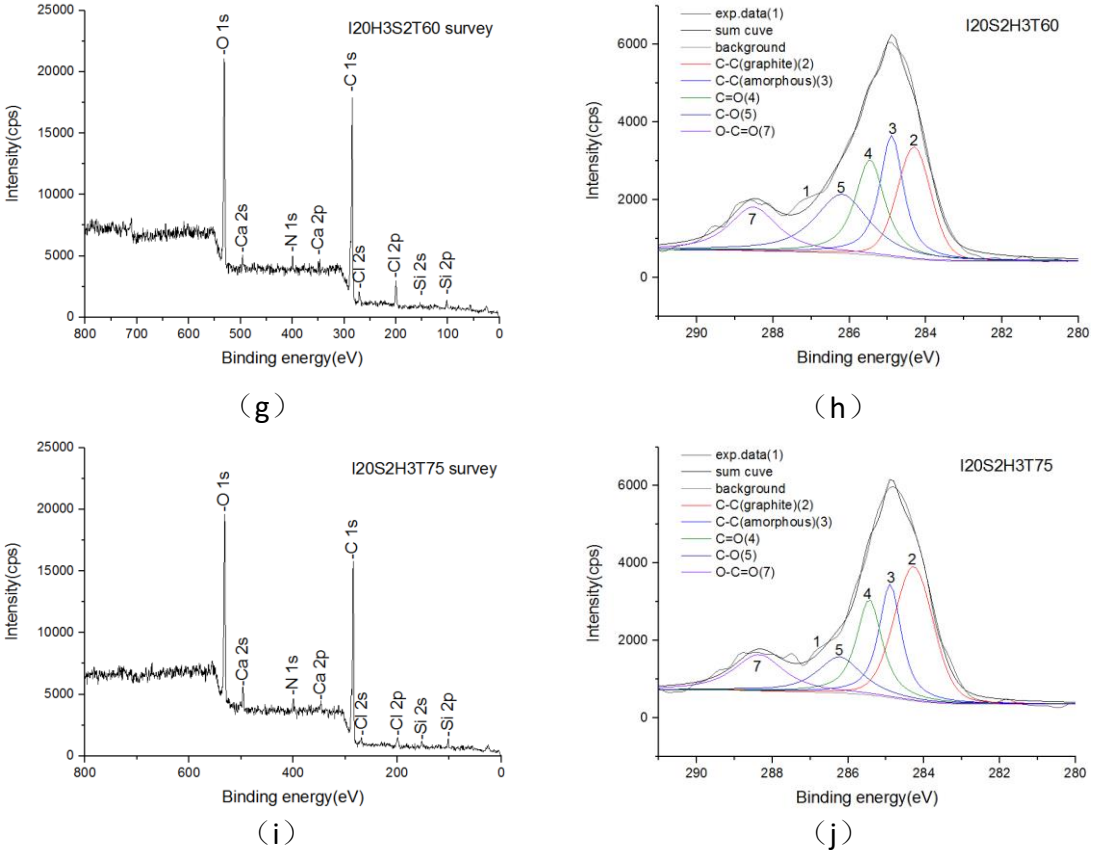


Figure SI 7 Cont.

Table SI 1 Experimental results of tensile tests (Unit: MPa)

Specimens	VCF	I20S2H1	I20S2H3	I20S2H5	I20S3H1	I20S3H3	I20S3H5	I40S2H1	I40S2H3	I40S2H5	I40S3H1	I40S3H3	I40S3H5
	3.676	3.016	3.125	2.550	3.120	2.805	2.352	3.152	2.852	2.195	3.052	2.785	2.281
	3.757	3.189	3.062	2.518	3.065	2.764	2.416	3.068	3.020	2.268	3.164	2.883	2.209
	3.632	3.173	2.833	2.487	2.894	2.845	2.325	3.123	3.108	2.234	3.018	2.850	2.156
	3.561	2.885	2.954	2.235	2.967	3.046	2.263	2.950	2.930	2.152	2.985	3.067	2.077
	3.832	2.938	2.786	2.412	2.950	2.921	2.38	2.851	2.914	2.386	2.916	3.001	2.047
	3.431	3.226	2.726	2.265	3.148	2.932	2.198	2.937	2.837	2.270	2.878	3.105	2.235
	3.658	2.918	3.046	2.281	3.085	2.980	2.267	2.915	3.121	2.341	2.863	2.847	2.347
	3.465	3.017	2.875	2.269	3.162	2.843	2.312	3.180	3.040	2.304	2.970	2.829	2.265
	3.431	2.873	2.870	2.490	3.076	2.814	2.371	3.261	2.938	2.128	3.179	2.966	2.170
Parallel	3.455	3.149	2.836	2.515	3.053	2.835	2.397	3.107	2.963	2.235	3.045	2.938	2.082
test results	3.552	3.031	3.130	2.597	2.915	2.925	2.355	3.020	2.870	2.285	3.157	2.900	2.138
	3.376	3.188	2.945	2.327	2.956	2.944	2.279	3.143	2.835	2.240	3.046	3.11	2.316
	3.335	3.279	2.892	2.310	2.850	3.013	2.255	2.875	2.942	2.425	2.938	2.918	2.259
	3.493	3.157	3.204	2.325	2.783	2.956	2.346	2.965	3.076	2.336	2.764	3.095	2.113
	3.792	2.839	3.116	2.209	2.879	2.860	2.283	3.002	3.122	2.098	2.881	2.824	2.006
	3.755	3.255	3.079	2.365	2.932	2.901	2.136	3.196	3.026	2.176	2.837	2.936	1.980
	3.851	2.934	2.825	2.592	3.137	2.753	2.180	2.768	3.005	2.250	3.055	2.851	1.965
	3.580	2.970	3.146	2.257	3.035	2.735	2.255	3.144	2.798	2.337	2.943	3.102	2.172
	3.657	3.162	2.983	2.448	3.088	3.075	2.316	3.236	2.847	2.173	2.965	3.077	2.235
	3.474	3.238	3.052	2.358	2.916	3.017	2.338	3.080	2.813	2.280	3.085	2.798	2.195
Mean	3.588	3.072	2.974	2.391	3.001	2.898	2.301	3.049	2.953	2.260	2.987	2.944	2.162
CoV	0.043	0.047	0.047	0.052	0.037	0.034	0.032	0.045	0.036	0.038	0.038	0.039	0.051

Table SI 1 Cont.

Specimens	I20H3S2T40	I20H3S2T60	I20H3S2T75	I40H3S2T40	I40H3S2T60	I40H3S2T75
Parallel test results	3.103	2.975	3.301	2.835	2.857	3.053
	2.937	3.285	3.228	2.772	2.925	2.892
	2.813	3.072	3.073	3.005	2.973	2.875
	3.124	3.154	3.043	2.915	3.120	2.769
	2.849	3.136	3.161	2.830	3.047	2.935
	2.950	3.250	3.310	2.850	2.906	2.984
	2.876	2.943	3.275	2.751	2.858	3.060
	3.071	3.056	3.076	2.825	2.876	3.125
	3.009	3.218	3.258	2.726	2.839	3.071
	2.885	3.257	3.334	2.935	2.855	3.028
	3.047	3.008	3.265	3.020	3.038	2.950
	3.136	3.056	3.052	3.003	3.052	2.853
	2.792	3.144	3.281	2.935	3.105	2.929
	2.875	3.108	3.365	2.837	2.816	2.963
	2.929	2.973	3.122	2.952	2.918	2.827
	3.015	3.175	3.260	2.918	2.953	3.066
	3.110	3.236	3.277	2.805	2.828	2.794
	2.926	3.072	3.128	2.922	3.075	2.931
	2.917	2.873	3.350	2.838	3.040	2.845
	2.930	3.207	3.127	2.951	2.900	3.150
Mean	2.965	3.118	3.214	2.881	2.949	2.960
CoV	0.036	0.037	0.033	0.030	0.034	0.037

Table SI 2 Experimental results of interfacial shear strength (IFSS) tests (Unit: MPa)

Specimens	VCF	I20S2H1	I20S2H3	I20S2H5	I20S3H1	I20S3H3	I20S3H5	I40S2H1	I40S2H3	I40S2H5	I40S3H1	I40S3H3	I40S3H5
Parallel test results	26.77	30.53	30.22	25.97	28.53	31.23	26.23	28.45	25.26	26.89	28.81	26.87	25.36
	27.41	31.43	29.58	26.18	27.45	30.55	25.70	26.91	27.21	25.54	27.70	27.65	26.24
	26.12	31.16	28.73	25.08	29.33	29.16	25.18	28.75	26.08	26.25	30.16	28.29	27.15
	28.06	31.85	29.15	24.56	28.21	30.75	26.75	29.83	25.62	25.70	29.37	25.76	24.71
	27.07	32.95	29.18	25.50	28.70	29.40	25.63	27.24	26.45	24.95	28.63	27.33	25.50
Mean	27.09	31.58	29.37	25.46	28.44	30.22	25.90	28.24	26.12	25.87	28.93	27.18	25.79
CoV	0.027	0.029	0.019	0.026	0.024	0.030	0.023	0.042	0.0029	0.028	0.032	0.035	0.036

Specimens	I20H3S2T40	I20H3S2T60	I20H3S2T75	I40H3S2T40	I40H3S2T60	I40H3S2T75
Parallel test results	23.40	28.71	24.56	24.91	26.38	24.17
	22.52	28.36	25.58	23.65	25.72	25.28
	22.89	27.43	24.16	23.16	28.02	23.56
	23.27	29.52	25.20	22.87	27.43	24.40
	21.83	28.25	26.06	22.94	26.21	24.03
Mean	22.78	28.45	25.11	23.51	26.75	24.29
CoV	0.028	0.027	0.030	0.036	0.035	0.026

Table SI 3 Experimental results of surface roughness (Unit: mm)

Specimens	VCF	I20S2H1	I20S2H3	I20S2H5	I20S3H1	I20S3H3	I20S3H5	I40S2H1	I40S2H3	I40S2H5	I40S3H1	I40S3H3	I40S3H5
Parallel test results	138	183	211	103	188	202	106	183	163	116	176	165	129
	145	185	207	108	192	196	113	180	157	121	178	161	131
	146	175	216	100	200	195	110	176	169	126	166	159	124
	149	179	199	107	196	188	105	172	162	125	173	157	134
	142	178	206	102	190	199	114	179	159	119	169	153	127
Mean	144	180	208	104	193	196	110	178	162	121	172	159	129
CoV	0.029	0.022	0.030	0.033	0.025	0.027	0.037	0.024	0.028	0.034	0.029	0.028	0.030

Specimens	I20H3S2T40	I20H3S2T60	I20H3S2T75	I40H3S2T40	I40H3S2T60	I40H3S2T75
Parallel test results	136	168	191	153	168	193
	133	165	187	154	173	188
	128	171	183	147	164	185
	137	173	177	147	175	198
	136	163	182	144	170	195
Mean	134	168	184	149	169	192
CoV	0.027	0.025	0.029	0.029	0.025	0.027