Supplementary Materials

Head-space SPME for the analysis of organophosphorous insecticide by silica IL-based fibers in real samples

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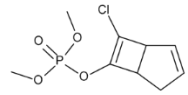
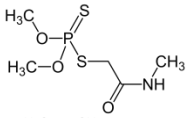
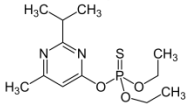
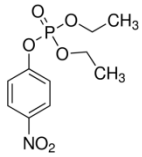
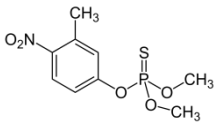
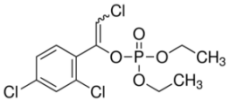
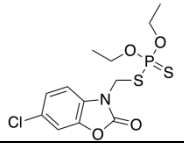
Table S1. Physicochemical properties of the studied insecticides.

compound	structure	pKa value	molecular weight [g/mol]	CAS number	$logK_{ow}$	purity [%]
heptenophos		2.72	250.61	23560-59-0	2.32	≥ 98.0
dimethoate		0.78	229.3	60-51-5	0.78	≥ 98.0
diazinon		3.11	304.35	333-41-5	3.30	≥ 98.0
paraoxon ethyl		1.98	275.19	311-45-5	1.98	≥ 95.0
fenitrothion		n.a.	277.23	122-14-5	3.30	≥ 95.0
chlorfenvinphos		4.70	359.6	470-90-6	3.81	~ 90%
phosalone		4.38	367.81	2310-17-0	4.38	≥ 98.0

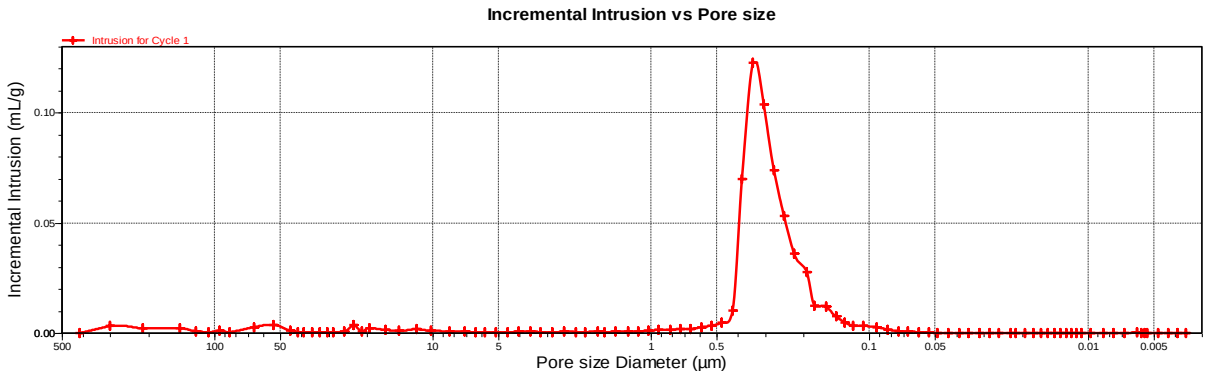


Figure S1. Mercury Intrusion Porosimetry: Plot of incremental intrusion vs. pore size. The measurement was performed with the use of AutoPore IV 9500 V1.09 Micrometrics Instrument Corporation.

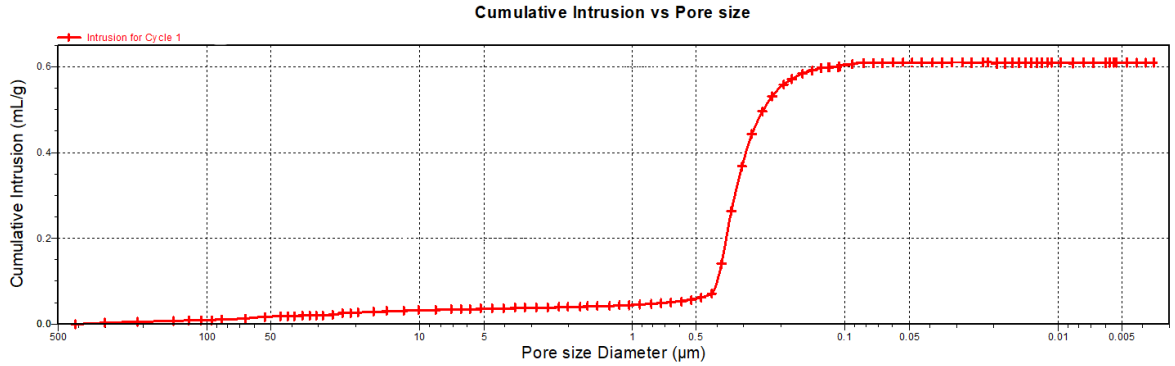
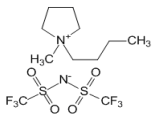
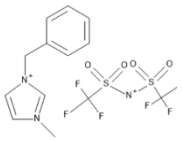
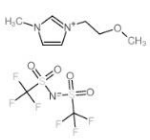
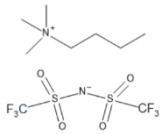


Figure S2. Mercury Intrusion Porosimetry: Cumulative intrusion vs. pore size. The measurement was performed with the use of AutoPore IV 9500 V1.09 Micrometrics Instrument Corporation.

Table S2. Physicochemical properties of the studied ionic liquids.

Ionic liquid (IL)	**IL structure**	**Acronym of IL**	**MW**	**Tm**	**Td**	**d**	**η**	**CAS**
1-Butyl-1-methylpyrrolidinium bis(trifluoromethylsulfonyl) imide		IL-1	422.4	<RT	360	1.40	95	223437-11-4
1-Benzyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide		IL-2	208.69	<RT	396	1.49	135	433337-24-7
1-(2-Methoxyethyl)-3-methylimidazolium bis(trifluoromethylsulfonyl) imide		IL-3	421.34	<RT	358	n.a.	46.9	178631-01-1
Butyltriethyl ammonium bis(trifluoromethylsulfonyl) imide		IL-4	369.4	<RT	>220	1.39	99.5	258273-75-5

[a] MW – molecular weight;
[b] T_m – melting point[ºC];
[c] T_d – decomposition temperature[ºC];
[d] d – density [$g_{*}cm^3$];
[e] η – viscosity [cP];
CAS – CAS number

Table S3. CCD plan and responses (sum of the peak areas), which were obtained to extract the insecticides with the investigated IL-2 based fiber.

No	System (CCD)	Extraction time [min]	Equilibration time [min]	Temperature [°C]	Salt concentration [%]	pH	Chromatographic peak area
1	25	70	50	60	15	3	5468
2	20	70	80	60	15	7	9366
3	14	90	65	50	20	5	10935
4	13	90	65	50	10	9	9941
5	31 (C)	70	50	60	15	7	8129
6	9	90	35	50	10	5	5965
7	32 (C)	70	50	60	15	7	7921
8	8	50	65	70	20	5	6416
9	30 (C)	70	50	60	15	7	8745
10	7	50	65	70	10	9	4447
11	17	30	50	60	15	7	4474
12	36 (C)	70	50	60	15	7	8153
13	1	50	35	50	10	9	3872
14	33 (C)	70	50	60	15	7	8986
15	26	70	50	60	15	11	7459
16	29 (C)	70	50	60	15	7	8201
17	22	70	50	80	15	7	9941
18	2	50	35	50	20	5	7570
19	19	70	20	60	15	7	9861
20	21	70	50	40	15	7	4971
21	12	90	35	70	20	5	9444
22	18	110	50	60	15	7	11432
23	28 (C)	70	50	60	15	7	8651
24	34 (C)	70	50	60	15	7	8742
25	35 (C)	70	50	60	15	7	7987
26	15	90	65	70	10	5	10935
27	6	50	65	50	20	9	7099
28	4	50	35	70	20	9	8947
29	3	50	35	70	10	5	5064
30	16	90	65	70	20	9	11929
31	10	90	35	50	20	9	6959
32	23	70	50	60	5	7	4474
33	11	90	35	70	10	9	8947
34	27 (C)	70	50	60	15	7	9341
35	5	50	65	50	10	5	3067
36	24	70	50	60	25	7	12128

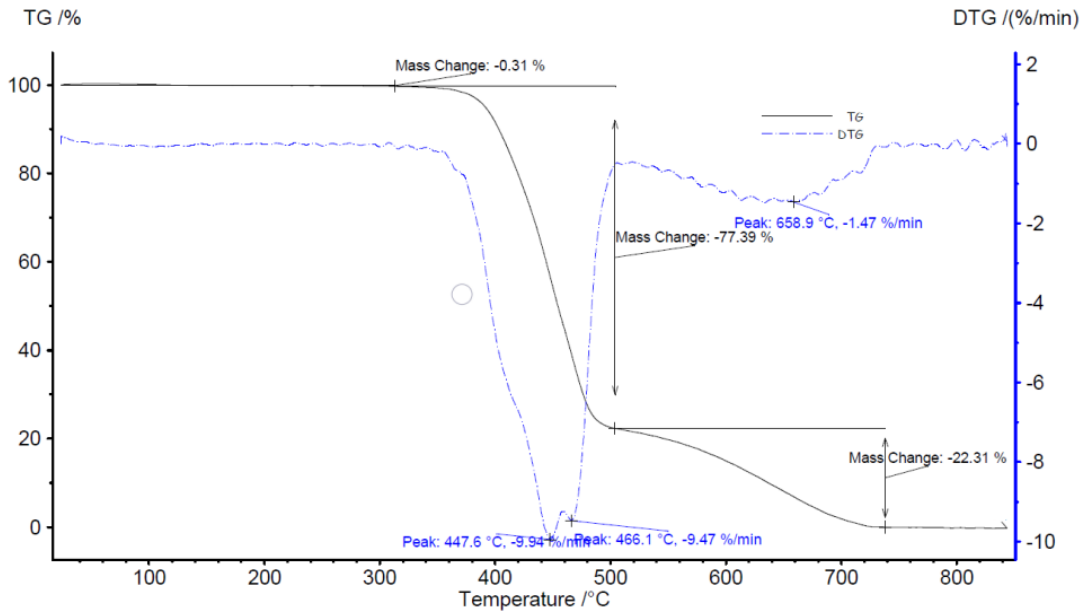


Figure S3. Thermogravimetric analysis of pure ionic liquid, namely 1-Benzyl-3-methylimidazolium bis(trifluoromethylsulfonyl) imide.

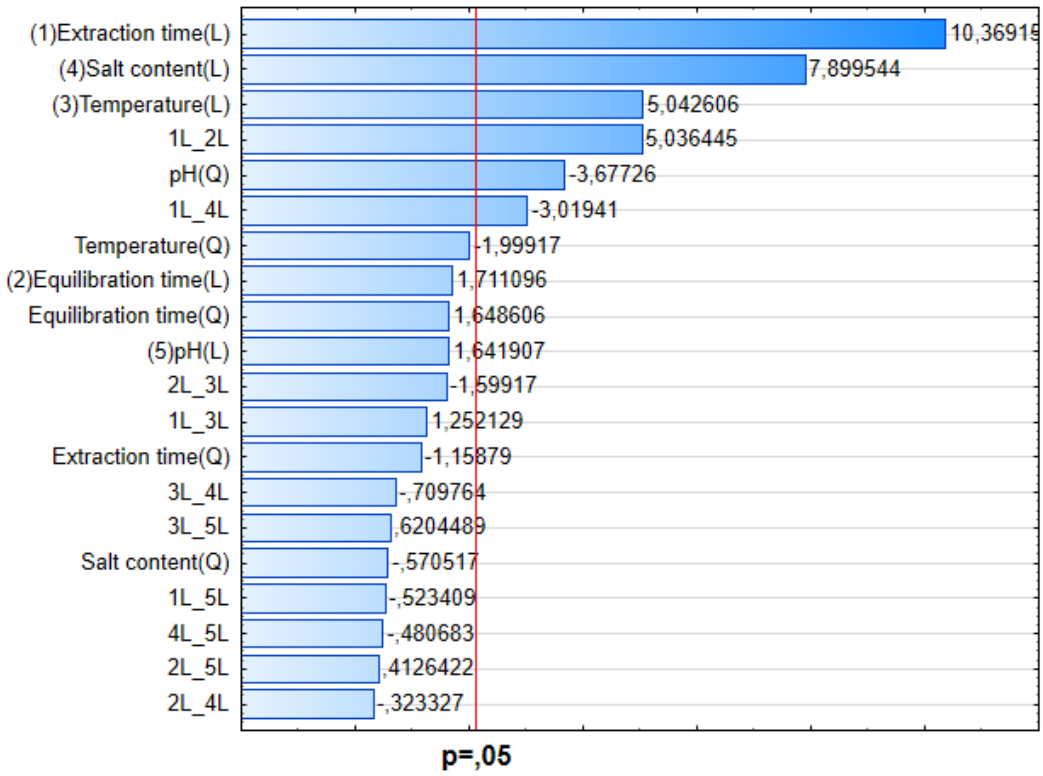


Figure S4. Statistical significance of the effects of the extraction parameters on extraction performance of the IL-based fiber: standardized effect Pareto chart.