

## Supplementary materials

Table S1. The theophylline-based ILs and imidazolium-based ILs used in the studies.

Compound	Name Molecular weight [g/mol]	Structure
C8T	Octyltrimethylammonium theophyllinate MW: 351.49	
C10T	Decyltrimethylammonium theophyllinate MW: 379.54	
C12T	Dodecyltrimethylammonium theophyllinate MW: 407.59	
C14T	Tetradecyltrimethylammonium theophyllinate MW: 435.65	
C16T	Hexadecyltrimethylammonium theophyllinate MW: 463.70	
C18T	Octadecyltrimethylammonium theophyllinate MW: 491.75	
C6Im	1-hexyl-3-methylimidazolium chloride MW: 202.72	
C8Im	1-methyl-3-octylimidazolium chloride MW: 230.78	
C10Im	1-decyl-3-methylimidazolium chloride MW: 258.83	
DC10Im	1,3-didecyl-2-methylimidazolium chloride MW: 399.10	

Table S2. BET and PZC analyses of studied nanoparticles

	MgO nanoparticles	SiO <sub>2</sub> nanoparticles
BET Surface Area	46.6530 ± 0.3040 m <sup>2</sup> g <sup>-1</sup>	154.8858 ± 1.5541 m <sup>2</sup> g <sup>-1</sup>
Correlation Coefficient	0.9998729	0.9998509
t-Plot Micropore Area	6.4513 m <sup>2</sup> g <sup>-1</sup>	63.0977 m <sup>2</sup> g <sup>-1</sup>
t-Plot External Surface Area	40.2017 m <sup>2</sup> g <sup>-1</sup>	91.7880 m <sup>2</sup> g <sup>-1</sup>
Point of Zero Charge	11.5	3.5