

## Hexafluorophosphate Ionic liquids-modified Silica Sorbent For Selective Separation and Preconcentration of Pb<sup>2+</sup>, Cd<sup>2+</sup>, and Cr<sup>3+</sup> in Water Samples

Linh Dieu Nguyen,<sup>a,b</sup> The Thai Nguyen,<sup>a,b</sup> Nhi Hoang Nguyen,<sup>a,b</sup> Chi Thien Gia Hua,<sup>a,b</sup>  
Tan Hoang Le Doan,<sup>b,c</sup> Linh Thuy Ho Nguyen,<sup>b,c</sup> Phuong Hoang Tran<sup>a,b\*</sup>

<sup>a</sup> Department of Organic Chemistry, Faculty of Chemistry, University of Science, Ho Chi Minh City, Vietnam.

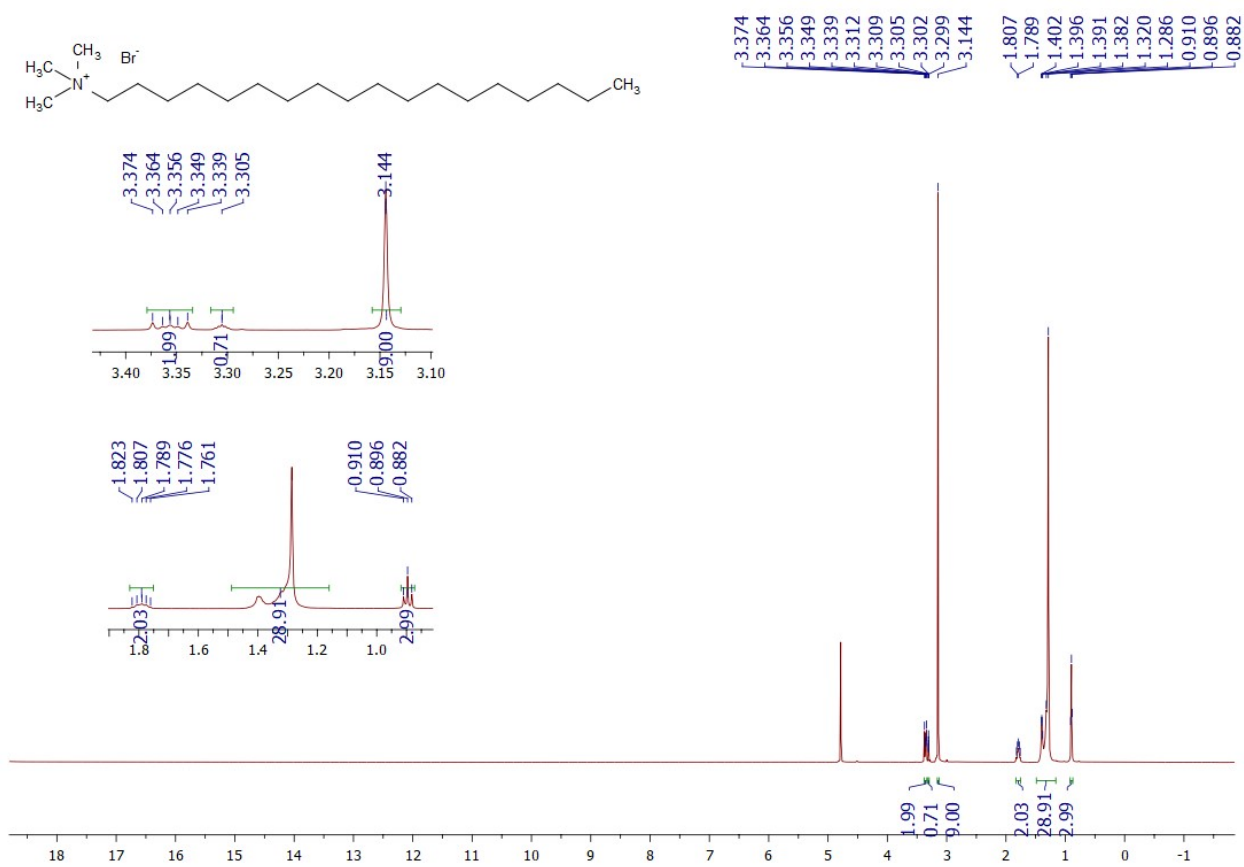
<sup>b</sup> Vietnam National University, Ho Chi Minh City, Vietnam.

<sup>c</sup> Center for Innovative Materials and Architectures (INOMAR), Ho Chi Minh City

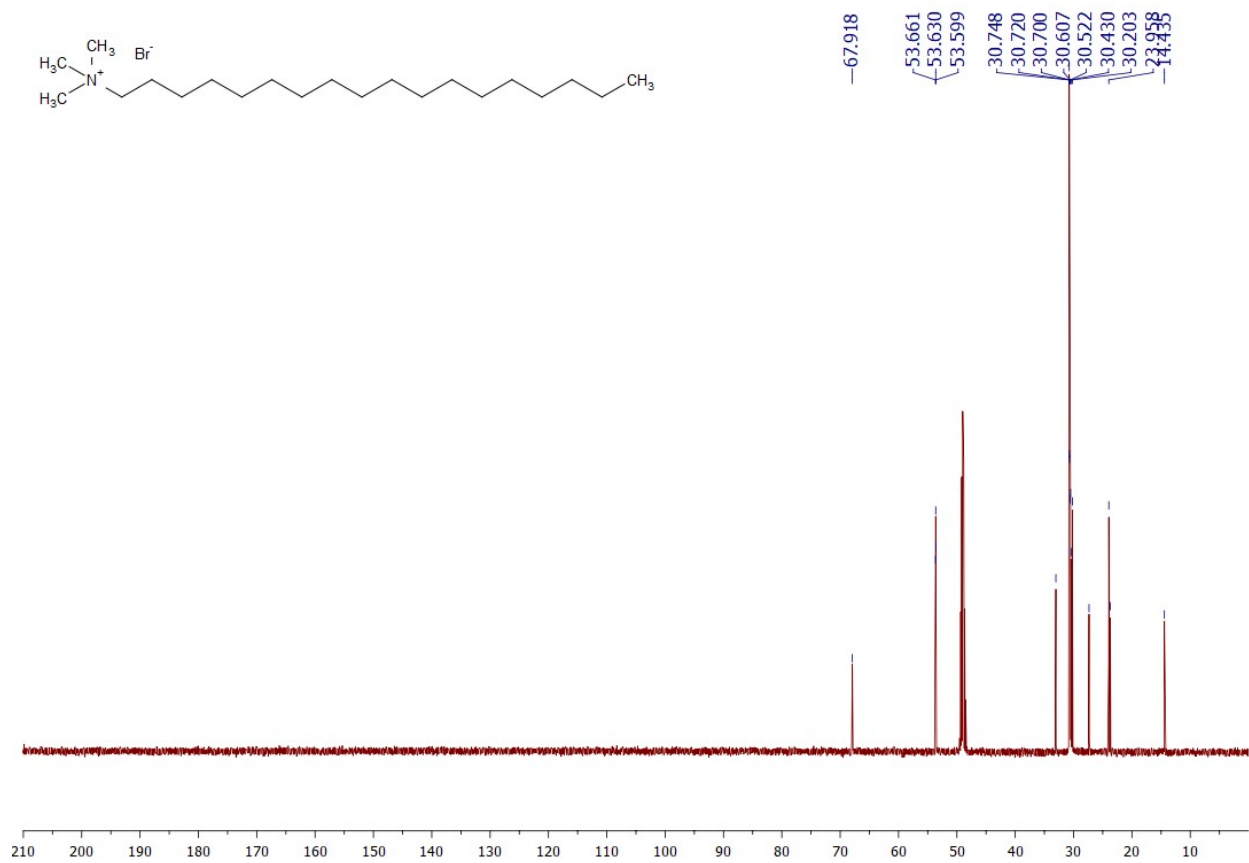
\* Corresponding authors: [thphuong@hcmus.edu.vn](mailto:thphuong@hcmus.edu.vn) (Phuong Hoang Tran)

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**Figure S1:**  $^1\text{H-NMR}$  of DL1



**Figure S2:** <sup>13</sup>C-NMR of DL1

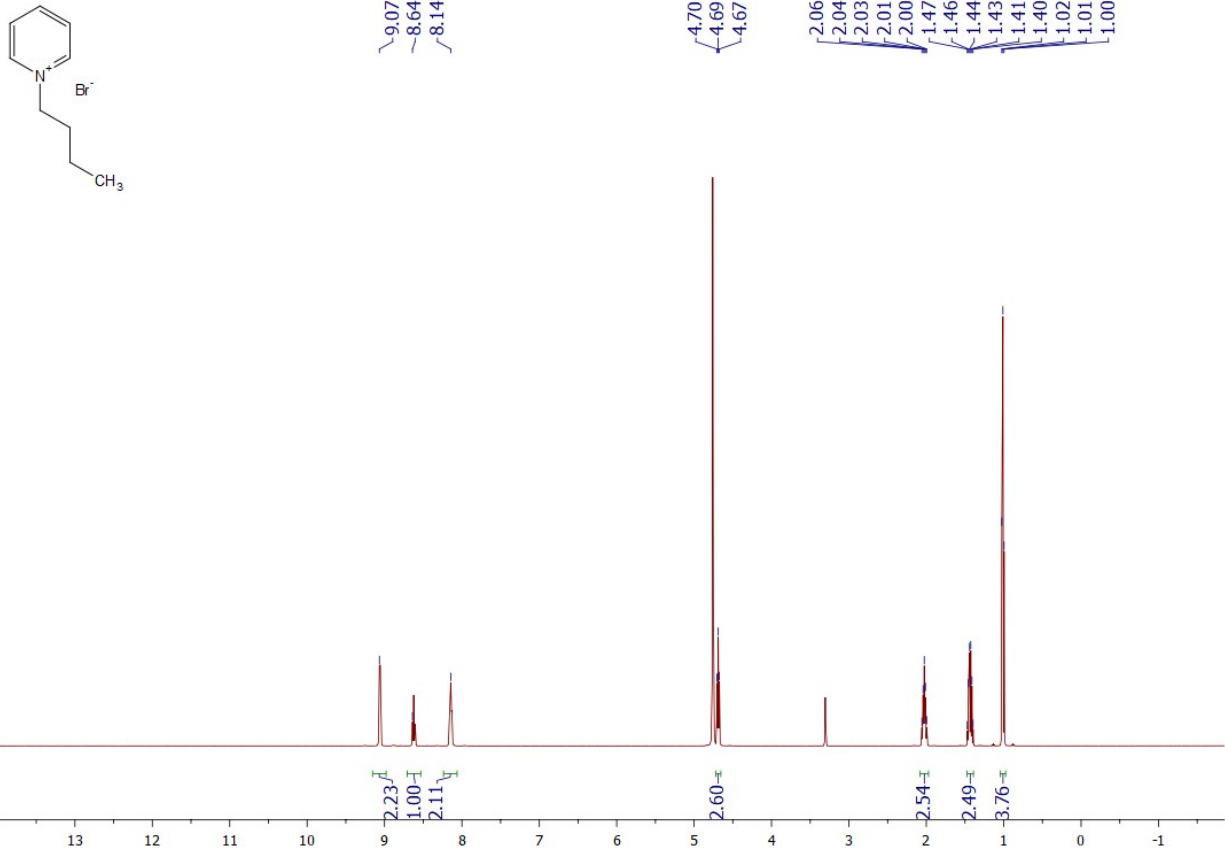
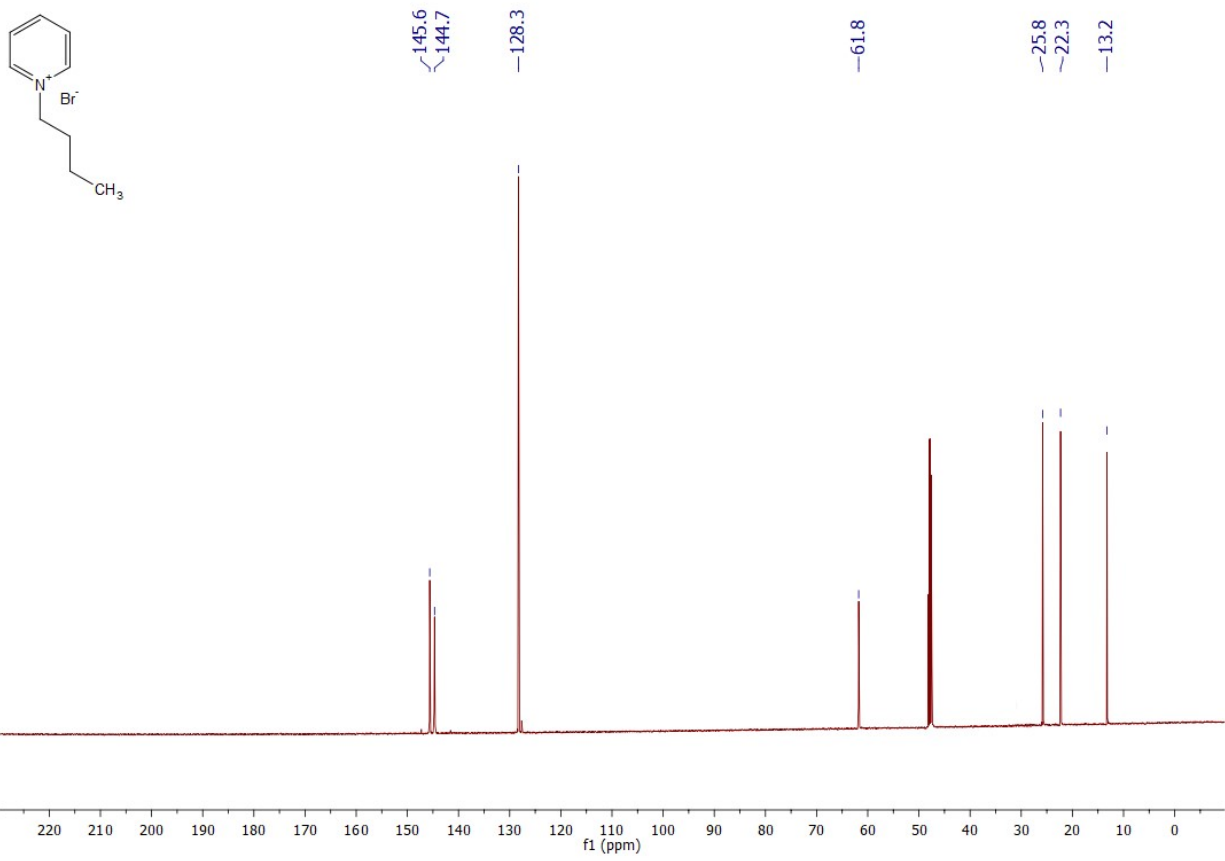
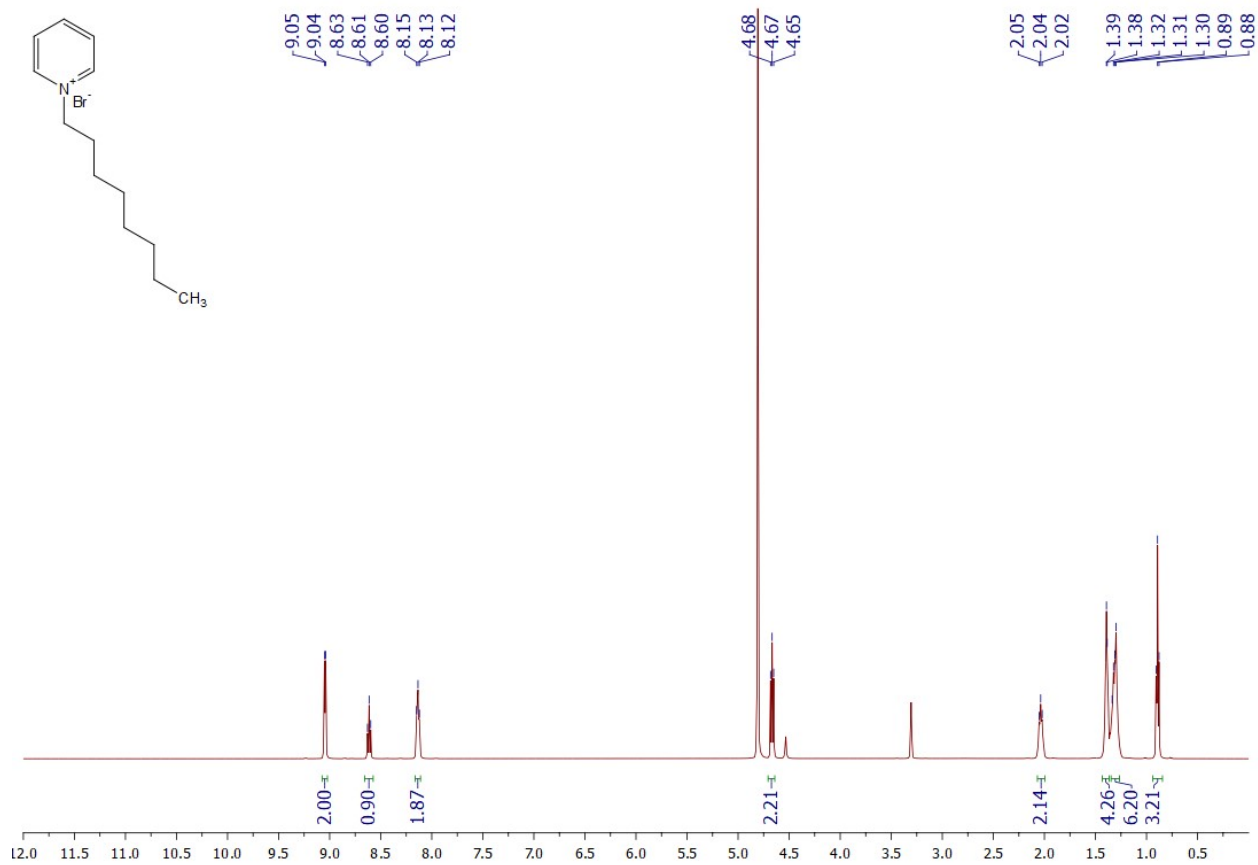


Figure S3: <sup>1</sup>H-NMR of DL2



**Figure S4:** <sup>13</sup>C-NMR of DL2



**Figure S5:** <sup>1</sup>H-NMR of DL3

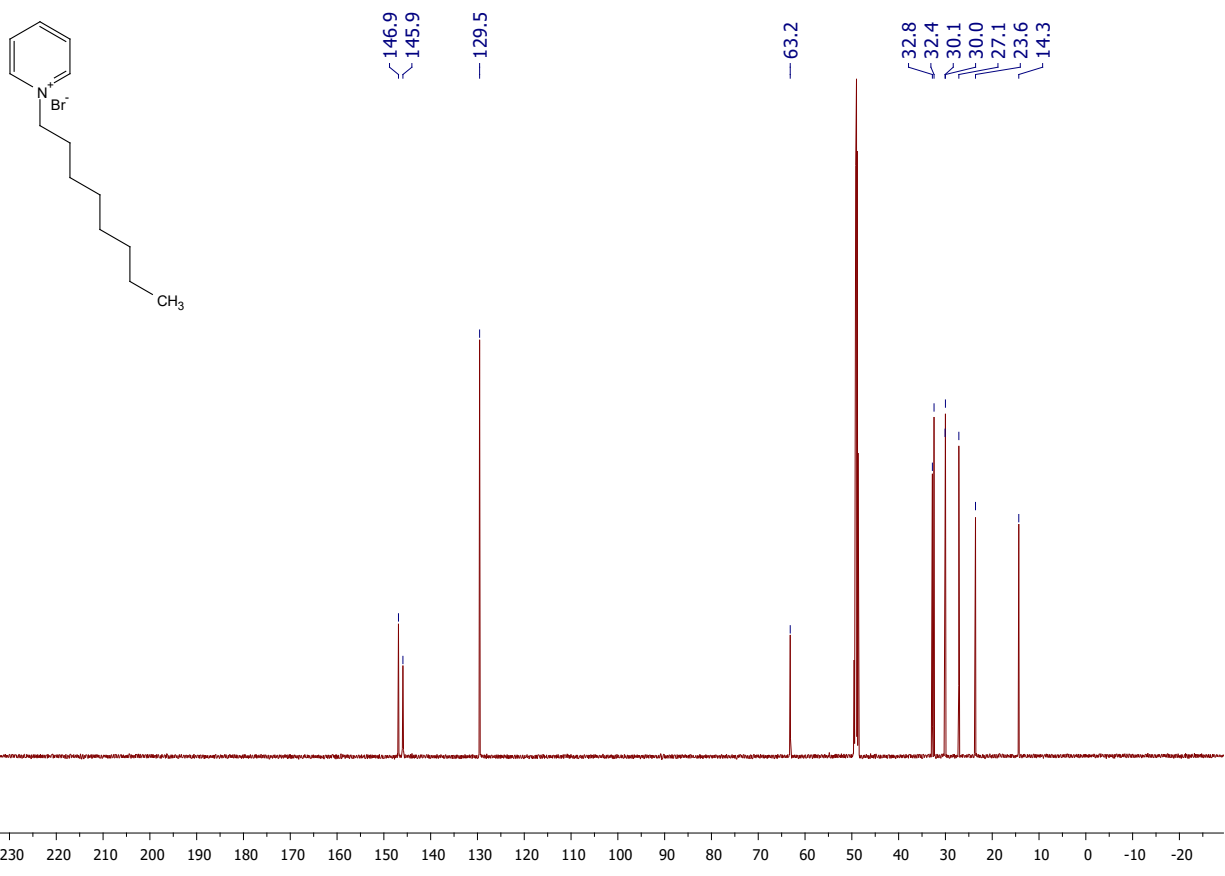
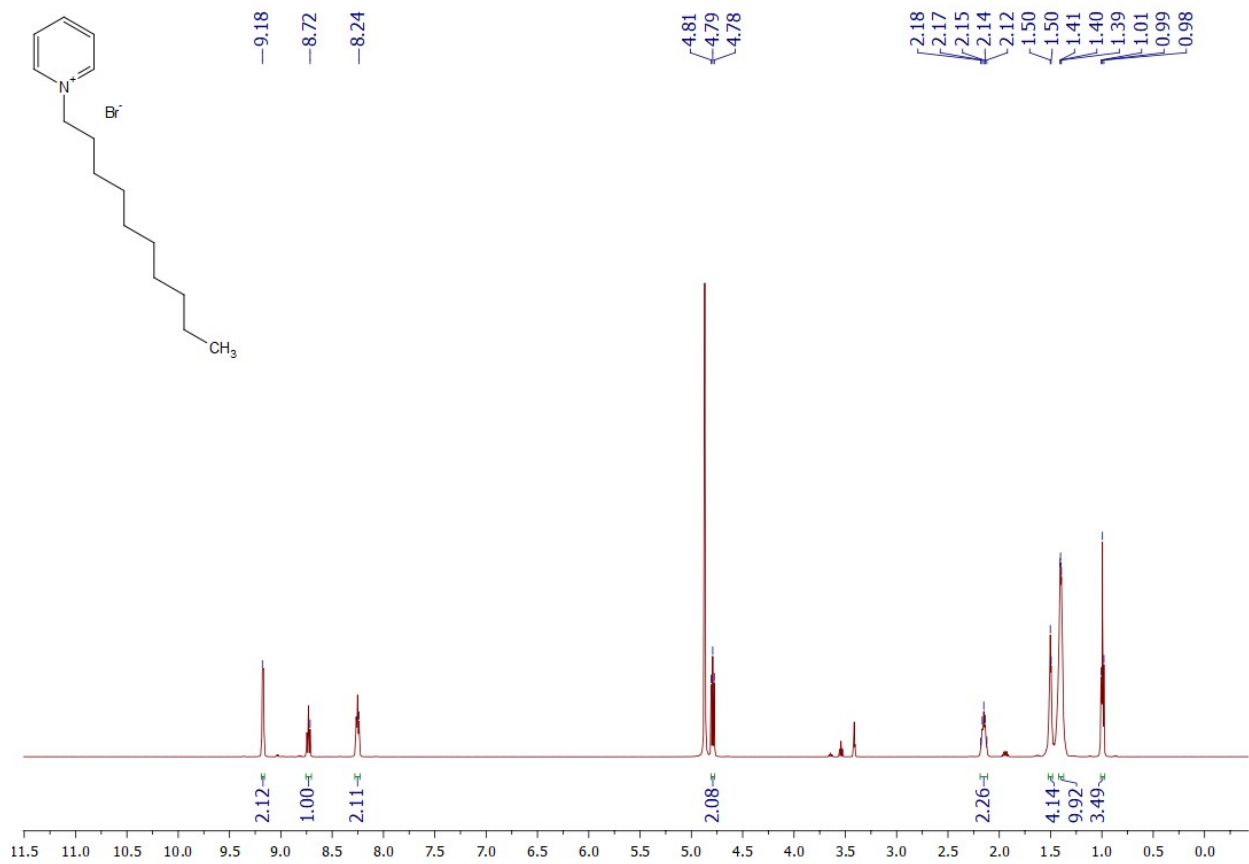
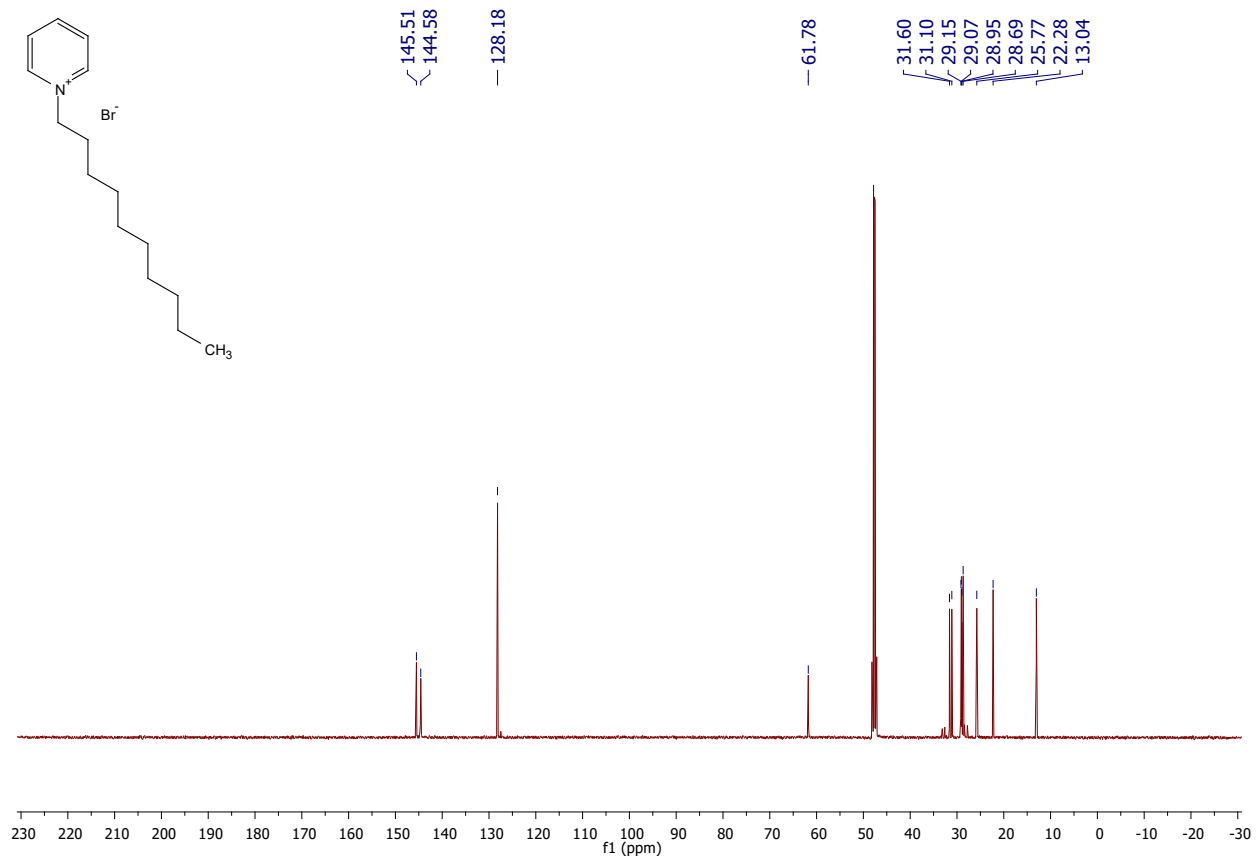


Figure S6: <sup>13</sup>C-NMR of DL3

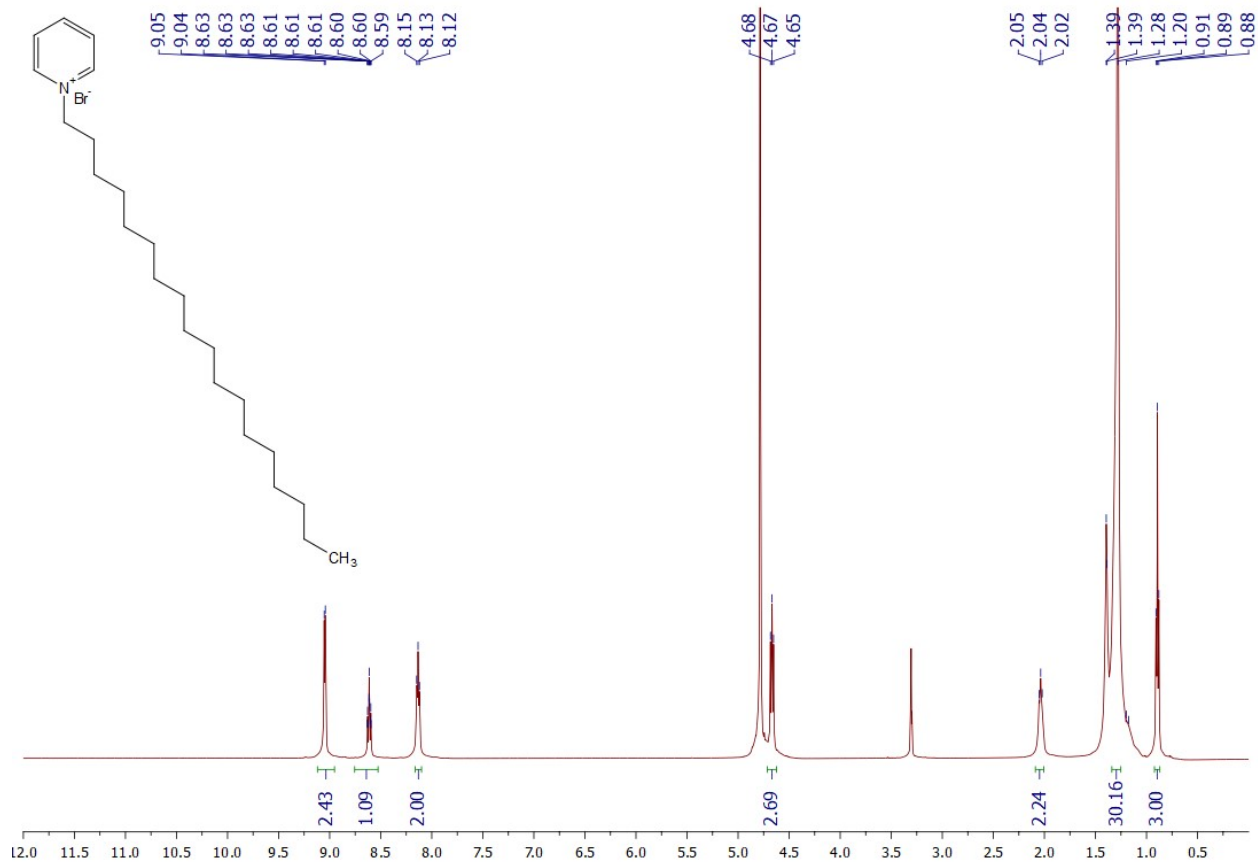


**Figure S7:** <sup>1</sup>H-NMR of DL4

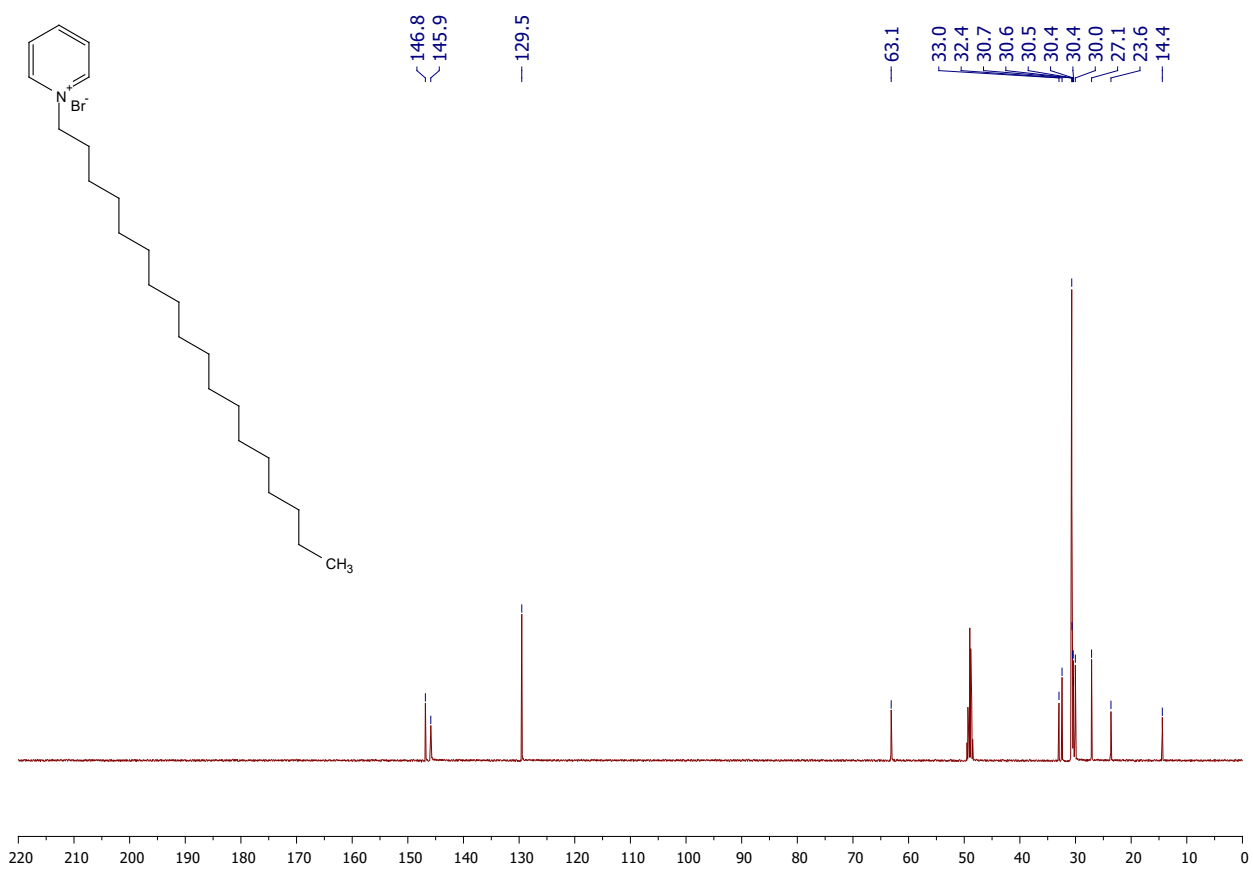




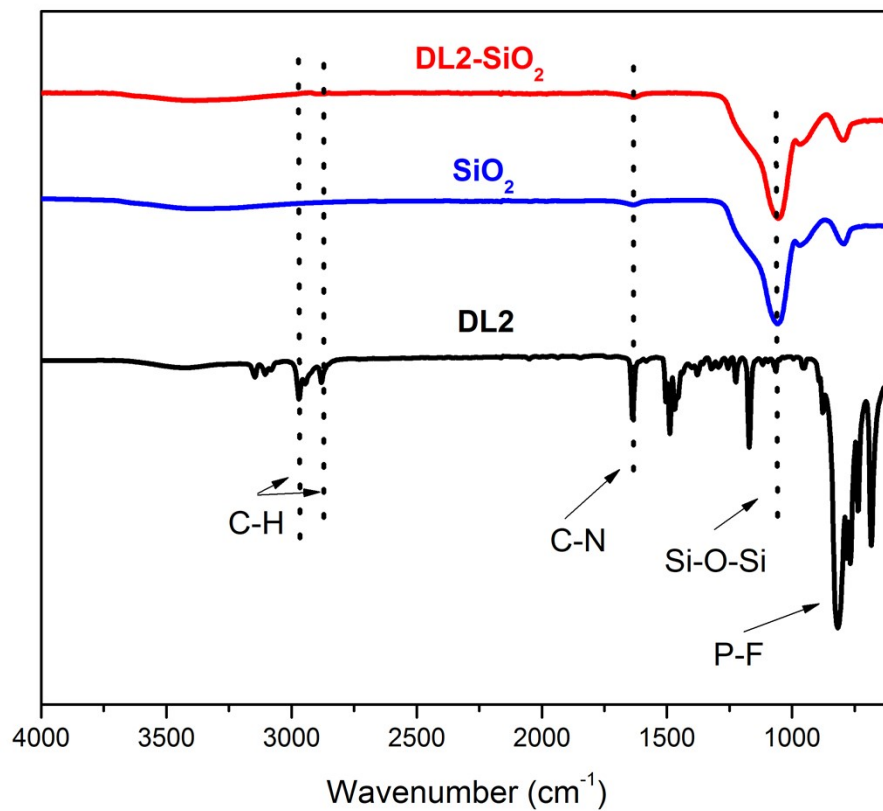
**Figure S8:** <sup>13</sup>C-NMR of DL4



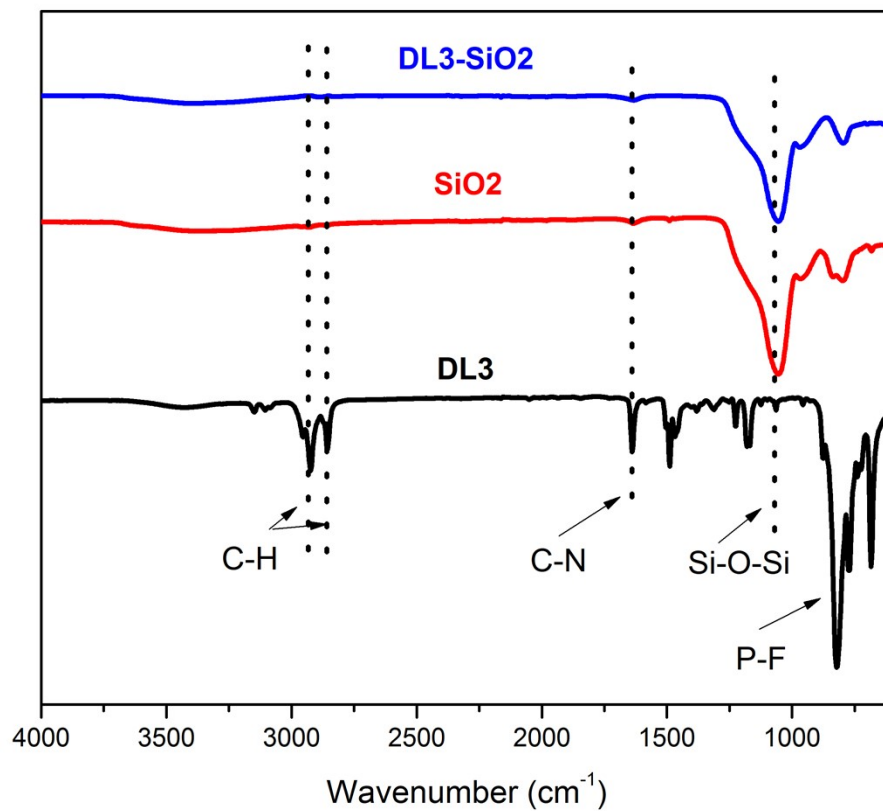
**Figure S9:**  $^1\text{H-NMR}$  of DL5



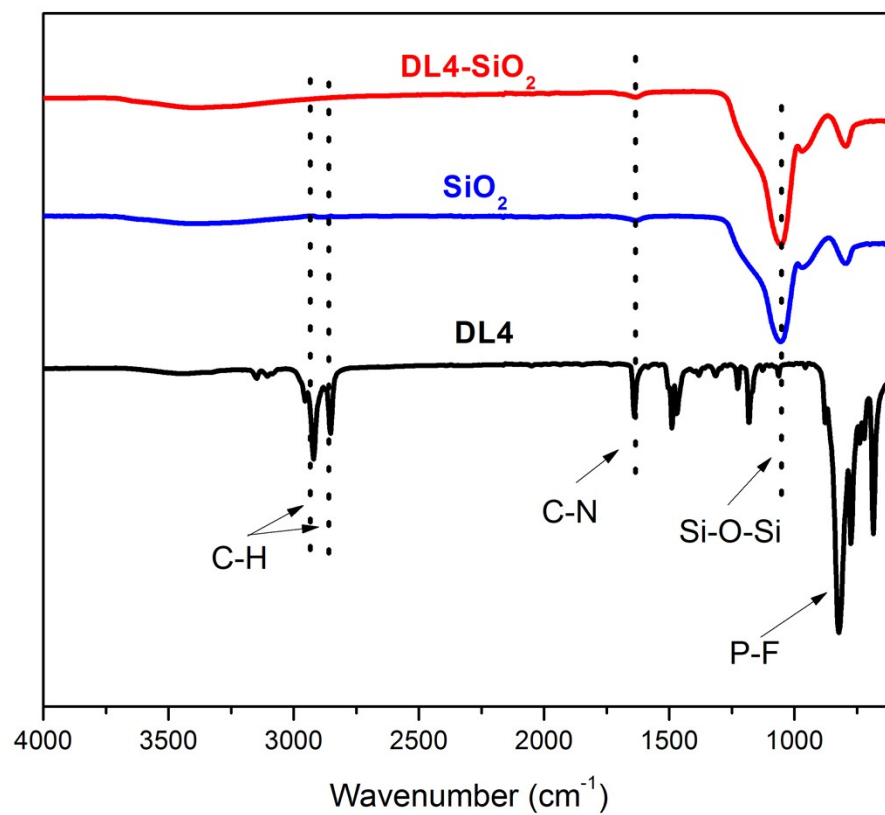
**Figure S10.** <sup>13</sup>C-NMR of DL5



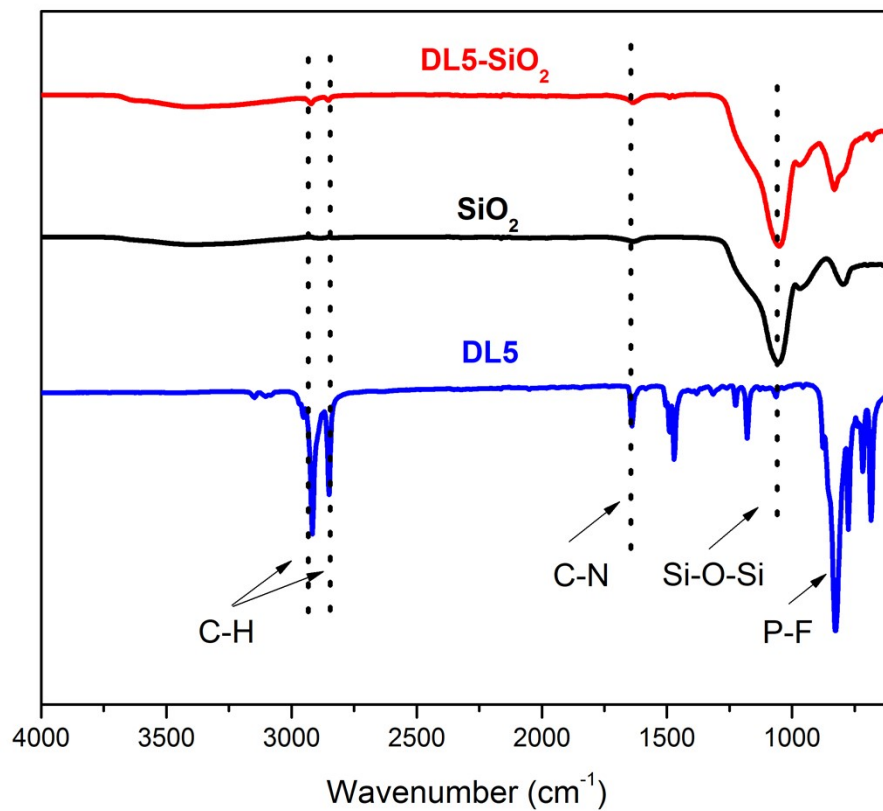
**Figure S11:** FT-IR spectra DL2-SiO<sub>2</sub>, SiO<sub>2</sub>, DL2



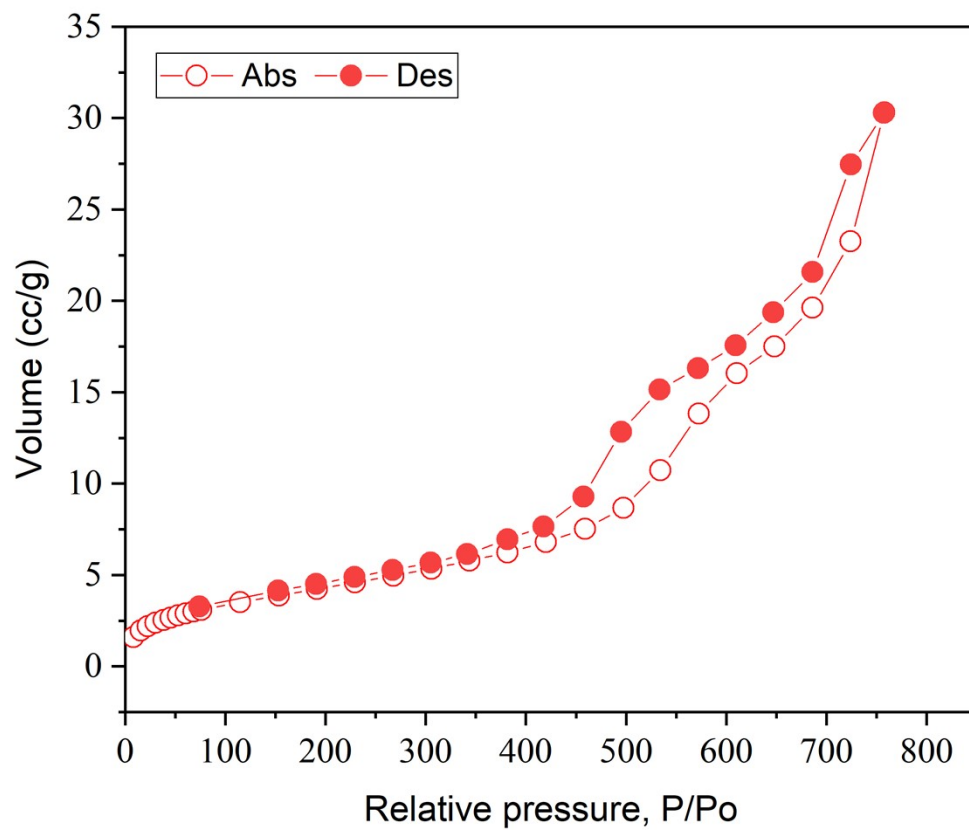
**Figure S12:** FT-IR spectra DL3-SiO<sub>2</sub>, SiO<sub>2</sub>, DL3



**Figure S13:** FT-IR spectra DL4-SiO<sub>2</sub>, SiO<sub>2</sub>, DL4



**Figure S14:** FT-IR spectra DL5-SiO<sub>2</sub>, SiO<sub>2</sub>, DL5



**Figure S15:** BET of DL1-SiO<sub>2</sub>