

# Ionic liquid capped carbon dots as the high-performance friction-reducing and antiwear additive of poly(ethylene glycol)

Baogang Wang,<sup>\*ac</sup> Weiwei Tang,<sup>c</sup> Hongsheng Lu<sup>\*abc</sup> and Zhiyu Huang<sup>abc</sup>

<sup>a</sup> *Oil & Gas Field Applied Chemistry Key Laboratory of Sichuan Province, Chengdu 610500, P. R. China*

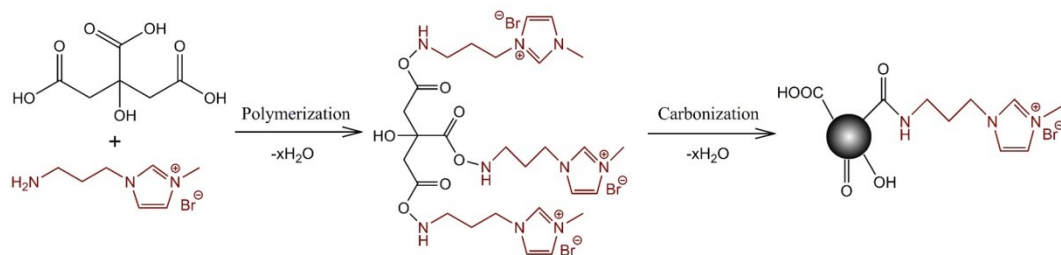
<sup>b</sup> *Engineering Research Center of Oilfield Chemistry, Ministry of Education, Chengdu 610500, P. R. China*

<sup>c</sup> *College of Chemistry and Chemical Engineering, Southwest Petroleum University, Chengdu 610500, P. R. China*

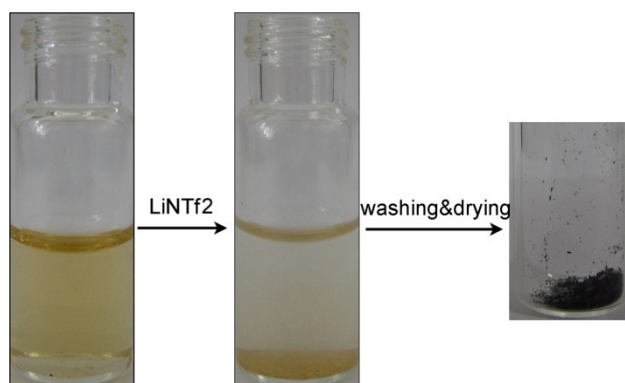
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\* Corresponding authors. Fax: +86-28-83037330; Tel.: +86-28-83037330.

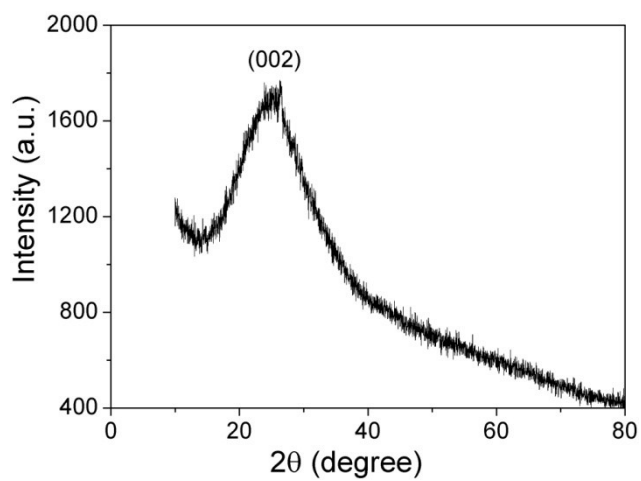
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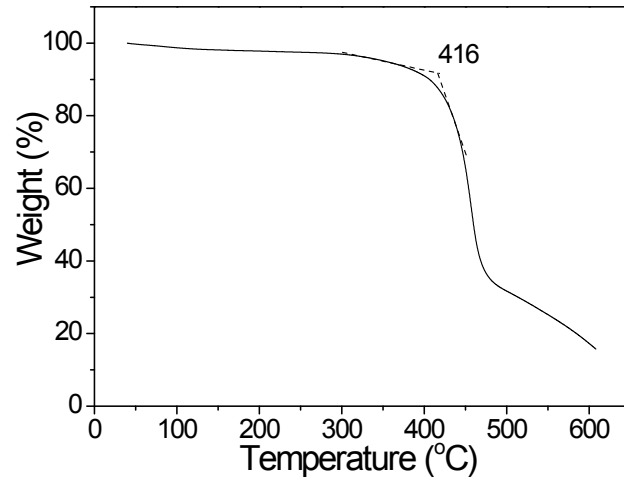
**Scheme S1** Schematic illustration of formation procedures of the CDs-Br<sup>-</sup>.



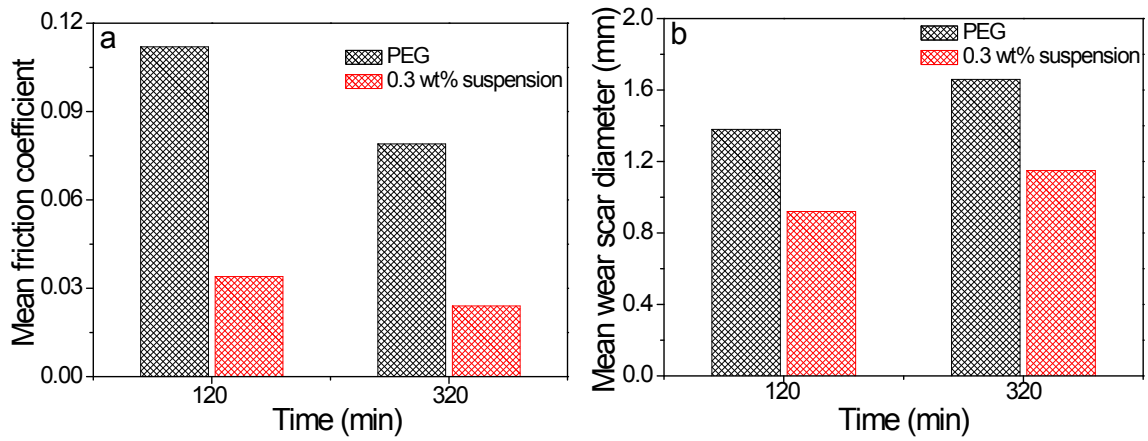
**Fig. S1** Preparation procedures of CQDs-NTf<sub>2</sub> from CQDs-Br<sup>-</sup> by the anion exchange.



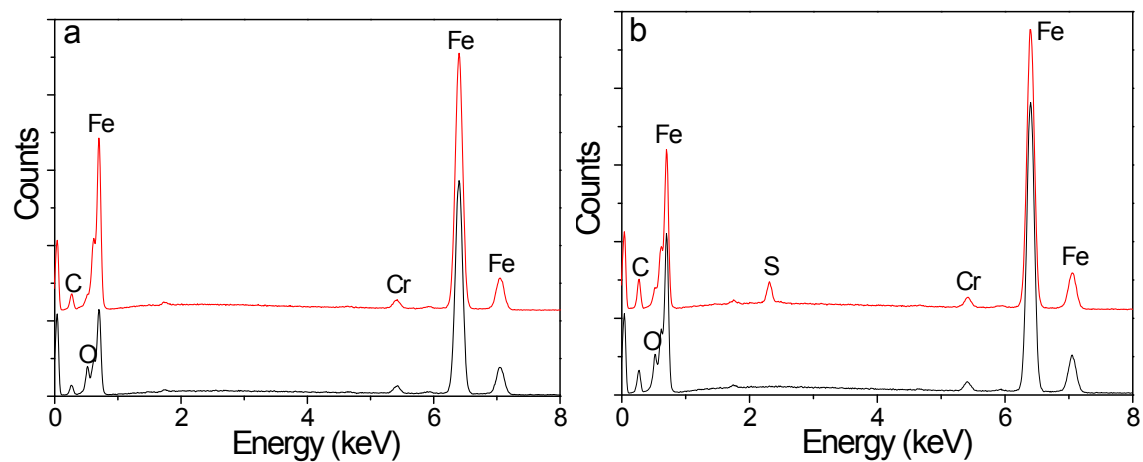
**Fig. S2** XRD pattern of CDs-Br<sup>-</sup>.



**Fig. S3** TGA curve of CDs-NTf<sub>2</sub> under air atmosphere.



**Fig. S4** (a) Mean friction coefficients and (b) mean wear scar diameters lubricated by PEG and 0.3 wt% CDs-NTf<sub>2</sub>/PEG suspension under tested duration times of 120 and 320 min (load: 392 N; rotate speed: 1200 r/min).



**Fig. S5** EDX spectra of the worn surfaces of lower steel balls lubricated by PEG (black line) and 0.3 wt% CDs-NTf<sub>2</sub>/PEG suspension (red line) under loads of (a) 392 N and (b) 600 N.