

## Accepted Manuscript

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PII: S0167-7322(18)30472-0  
DOI: doi:[10.1016/j.molliq.2018.06.042](https://doi.org/10.1016/j.molliq.2018.06.042)  
Reference: MOLLIQ 9240  
To appear in: *Journal of Molecular Liquids*  
Received date: 30 January 2018  
Revised date: 1 June 2018  
Accepted date: 11 June 2018

Please cite this article as: Wangji Shang, Mengting Ye, Tao Cai, Lina Zhao, Yunxiao Zhang, Dan Liu, Shenggao Liu , Tuning of the hydrophilicity and hydrophobicity of nitrogen doped carbon dots: A facile approach towards high efficient lubricant nanoadditives. Molliq (2017), doi:[10.1016/j.molliq.2018.06.042](https://doi.org/10.1016/j.molliq.2018.06.042)

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# Tuning of the hydrophilicity and hydrophobicity of nitrogen doped carbon dots: A facile approach towards high efficient lubricant nanoadditives

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## Abstract

Nanosizing is considered as a promising approach for achieving better dispersibility of nanoparticles in mediums, while the regulation of their hydrophilicity and hydrophobicity is very important issue for wide application of nanoparticles. Herein, nitrogen-doped carbon dots (N-CDs) with hydrophilicity was prepared via namely “bottom-up” and exhibited excellent excitation-dependent maximum fluorescence at 480/560 nm, while a novel kind of liquid-like N-CDs with hydrophobicity was synthesized followed via covalent grafting strategem and exhibited excellent excitation-dependent maximum fluorescence at 500/580 nm. Both hydrophilic and hydrophobic N-CDs exhibited favorable dispersion stability in polar and apolar mediums respectively and were used for the first time as friction-reducing and antiwear nanoadditives in selected PEG and PAO synthetic base oils for steel/steel contact, which offered great potential in lubricant field as demonstrated for the highly efficient carbon dots nano-additives in reducing both undesirable friction and wear.

**Keywords:** nitrogen-doped carbon dots; hydrophilicity and hydrophobicity; lubricant nanoadditives; tribological performance

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