

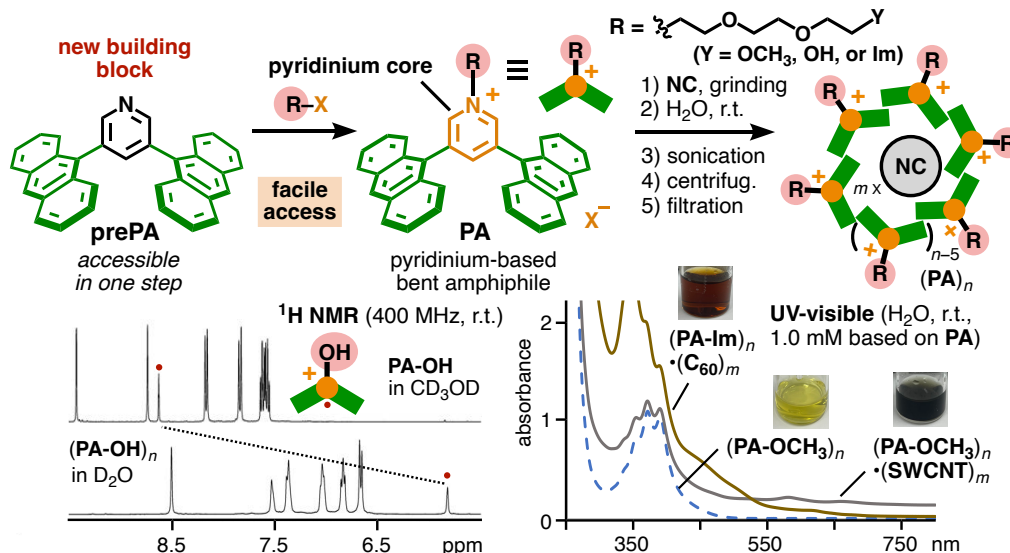
Non-covalent Functionalization of Nanocarbons via Encircling with Pyridinium-based Bent Amphiphiles

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Nanocarbons, such as fullerenes and carbon nanotubes, are continuing to attract significant attention due to their unique chemical and physical properties. Water-solubilization and functionalization of nanocarbons are desirable for both their bioapplications and processing, but so far have mainly relied on i) covalent modification, resulting in undesired property changes^[1] and ii) non-covalent lining with amphiphiles bearing non-interactive *ionic surface groups*.^[2] The development of new amphiphiles featuring strong solubilizing abilities and *non-ionic surface groups* on the other hand would grant access to aqueous nanocarbons with tunable surface functions, allowing control over their intermolecular interactions in water.

We here report the facile 2-to-3 step synthesis of pyridinium-based bent amphiphiles **PA**, featuring variable functionalities at the attached side-chain (R). The surface functionalities (e.g., Y = OH or imidazole (Im)) can be introduced via facile quaternization of novel building block 3,5-dianthrylpyridine **prePA** (Figure, top left). The amphiphiles were shown to assemble into nanosized aromatic micelles (**PA**)_n upon dissolution in water, independent of the functional group. Importantly, efficient water-solubilization and surface functionalization of nanocarbons (**NCs**; e.g., fullerene **C**₆₀ and **SWCNT**) could be achieved through encircling with the present pyridinium-based amphiphiles (Figure, bottom right). Imidazole-functionalized **PA-Im** was furthermore found to display metal-coordination abilities in aqueous solution.



[1] V. Georgakilas, K. Kordatos, M. Prato, D. M. Guldi, M. Holzinger, A. Hirsch, *J. Am. Chem. Soc.* **2002**, 124, 760. [2] N. Nakashima, Y. Tomonari, H. Murakami, *Chem. Lett.* **2002**, 31, 638.