Synthesis and Characterization of Fluorescent Rosette Nanotubes*

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Rosette nanotubes (RNTs) are novel soft organic nanomaterials composed of a guanine-cytosine hybrid (G\textsuperscript{+}C) building block that self-assembles in aqueous environments into stable nanotubes decorated with chemical functionalities on the periphery. These materials have substantial design flexibility and a range of applications, which are partly attributed to their diverse surface functionalization. Since their first development in the Fenniri group,\textsuperscript{1} several studies established their applications as coatings for medical devices, materials for tissue engineering and drug display/delivery.\textsuperscript{2,3,4}

In an effort to reduce the synthetic effort for producing self-assembling G\textsuperscript{+}C modules for large scale production of RNTs, we have developed an efficient synthetic strategy and self-assembly protocols based on a new G\textsuperscript{+}C derivative 2, an analogue of 1 that differs by the substitution at the N-atom in the G-ring with a C-atom.\textsuperscript{5} In this talk, we present the synthesis of the tricyclic G\textsuperscript{+}C base 3 from R\textsubscript{3} functionalized motif 2 that can form fluorescent RNTs in N,N-dimethylformamide (DMF). The self-assembly of 3 into RNTs was established using scanning electron microscopy, transmission electron microscopy, atomic force microscopy and UV-Vis spectroscopy. Fluorescence properties of RNTs in DMF will also be presented.

* This work is supervised by Prof. Hicham Fenniri, Northeastern University, Boston, MA, USA.
References


