# Synthesis of MX-tube compounds soluble in organic media

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MX-tubes are an emerging kind of tubular compounds obtained from oxidative polymerization of macrocyclic complexes using halogen, which have the advantages of tunable electronic structure and channel structures.[1,2] Recently, a variety of MX-tube compounds were synthesized and their unique properties were also well demonstrated, such as selective sorption and high proton conduction.[3,4] However, these studies were limited to the aggregated solid state, leading to difficulties in direct observation of physical and chemical behavior in a single MX-tube. Besides, in light of application use of MX-tube such as thin film devices, to obtain the MX-tube compounds soluble in organic media is highly desired and challenging.

Herein, an anionic surfactant (dodecyl benzene sulfonate, $dbs^-$) was used as the counter anion of MX-tube to improve the solubility in organic media. Two kinds of MX-tubes, $[Pt(en)(bpy)X]_4(dbs)_8$ (en: ethylenediamine, bpy: 4,4'-bipyridine, X = I (**1**), Br (**2**)), were synthesized by mixing the precursor solution and aqueous solution containing $dbs^-$ at room temperature (**Figure 1**). The nanotubular structure of obtained compounds were confirmed by TEM observation, PXRD, Raman, and diffuse reflectance spectra. Due to the existence of anionic surfactants, **1** and **2** showed high solubility in chloroform solution, which is quite different from that of typical MX-tube compounds. Details are presented.

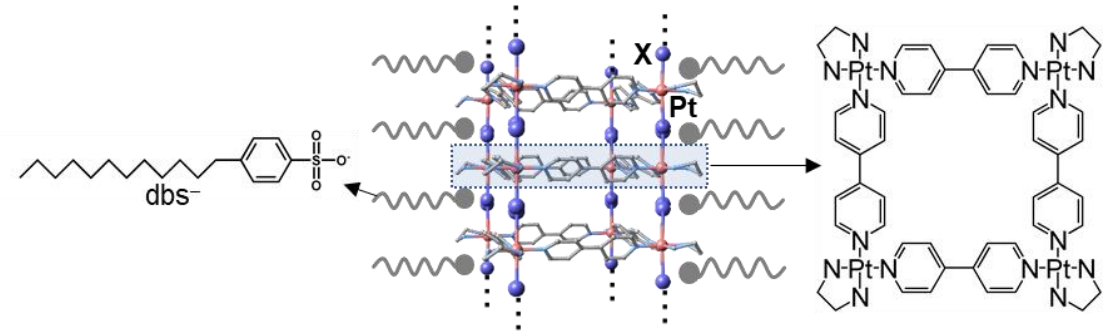


**Figure 1.** Schematic view of synthesized MX-tube, $[Pt(en)(bpy)X]_4(dbs)_8$ (en: ethylenediamine, bpy: 4,4'-bipyridine, X = Br, I).

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