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Self-Assembly of Porphyrin J-Aggregates VALENTINAS SNITKA, Research Center for Microsystems and Nanotechnology, Kaunas University of Technology, Lithuania, MINDAUGAS RACKAITIS, Bridgestone CRT, Akron OH, USA, GINTARE NAVICKAITE, Research Center for Microsystems and Nanotechnology, Kaunas University of Technology, Lithuania — The porphyrin nanotubes were built by ionic self-assembly of two oppositely charged porphyrins in aqueous solution. The porphyrins in the acid aqueous solution self-assemble into J-aggregates, wheels or other structures. The electrostatic forces between these porphyrin blocks contribute to the formation of porphyrin aggregates in the form of nanotubes, enhance the structural stability of these nanostructures. The nanotubes were composed mixing aqueous solutions of the two porphyrins - anionic Meso-tetra(4- sulfonatophrnyl)porhine dihydrochloride ($TPPS_4$) and cationic Meso-tetra(4-pyridyl)porphine (T_4MPyP). The porphyrin nanotubes obtained are hollow structures with the length of 300 nm and diameter 50 nm. Photocatalytic porphyrins are used to reduce metal complexes from aqueous solution and to control the deposition of Au from $AuHCl_4$ and Au nanoparticles colloid solutions onto porphyrin nanotubes. Porphyrin nanotubes are shown to reduce metal complexes and deposit the metal selectively onto the inner or outer surface of the tubes, leading to nanotube-metal composite structures.

Valentinas Snitka
Research Center for Microsystems and Nanotechnology, Kaunas University of Technology, Lithuania

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