

Synthesis of molybdenum disulphide (MoS₂) gadolinium complex with core shell structure used as *in vivo* MRIRajeshkumar Anbazhagan¹, Hsieh-Chih Tsai² and Ru-Jong-Jeng²¹National Taiwan University of Science and Technology, Taiwan²National Taiwan University, Taiwan

In this paper, water soluble core shell molybdenum disulphide (MoS₂) gadolinium complex was synthesized and used as *in vivo* MRI contrast agents. Briefly, monolayer MoS₂ nanosheets were exfoliated with help of thioglycolic acid (TGA) as stabilizing agents by room temperature stirring followed by the sonication in water. Subsequently, luminescent MoS₂ quantum dots with sustained fluorescence emission, which were fabricated through hydrothermal treatment of exfoliated MoS₂ and could be utilized as cell biomarkers. These primary *in vitro* cell imaging results proved the biocompatibility of the nanomaterials, it could be used as *in vivo* imaging candidate in future. Therefore, we develop core-shell molybdenum disulfide and gadolinium complex, as an alternative *in vivo* MRI candidate. The synthesized core-shell contrast agents' exhibits enhanced paramagnetic property; compared to commercial gadolinium contrast agents core-shell MoS₂ chelate has 4.5-times longer water proton spin-lattice relaxation time (T₁); as well as lowered toxicity, extended blood circulation time, increased stability and desirable excretion characteristic. Transmission electron microscopy (TEM) proved core-shell nanoparticles 100 nm in size. These findings suggest that the synthesized nanomaterials possess high potential as a positive contrast agent for the enhancement of MRI imaging.

Biography

Rajeshkumar Anbazhagan has completed his Master's degree from Annamalai University and studying PhD in National Taiwan University of Science and Technology, Taiwan. He has published 2 papers in reputed journals.

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