

Metal Oxide/Carbon Core-Shell Nanocomposites with Enhanced Photostability and Photoresponse

이태형, 권우성^{1,†}

포항공과대학교; ¹숙명여자대학교 화공생명학부

(wkwon@sookmyung.ac.kr[†])

Metal oxide/carbon core-shell which add properties of carbon nanomaterials to the inherent combine carbon nanoparticles have the potential to have better optical, electrical, and mechanical properties than using only metal oxide materials. Here I have designed TiO₂ NPs (Degussa P25) @ carbon shell with 1 to 2 nm thickness are prepared as a photocatalyst. The photocatalyst shows a higher photocatalytic performance than the P25 by carbon shell. In the hexavalent chrome ion reduction reaction using TiO₂ NPs @ carbon shell, the initial reaction rate is doubled compared to P25. Secondly, I have studied IONPs @ carbon shell for multimodal theragnosis. IONPs are currently used as magnetic resonance imaging (MRI) contrast agents due to its superparamagnetism Carbon shells can exhibit photothermal effects because they have various energy states, so that IONPs @ carbon shell could be used for photothermal therapy and MRI. When irradiating 606 nm laser on IONPs @ carbon shell for 10 min, temperature increase by 5 oC (47 oC) compared to IONPs.