Synthesis of Iron Oxide-based Ordered Mesoporous Binary Metal Oxides for Enhancing Photocatalytic Activity

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In order to purify the air and water, photocatalysts for pollutant degradation have been studied up to date. Photocatalysis is one of the most promising alternative techniques to decontaminate wastewaters due to the decrease in the quality of available drinking water in the world. This phenomenon has been occurred by a population explosion of human race. Among photocatalyst candidates, TiO_2 is a well-known photocatalyst with high photocatalytic activity under only UV light, high stability, and low toxicity. As mentioned before, TiO_2 has the photocatalytic activity under only UV light, thus, it is necessary for us to find or modify the proper catalyst which absorbs and utilizes visible light also. For enhancing photocatalytic activity, photocatalysts should have large surface area for lots of active sites and well-defined crystallinity. In this research, we synthesized iron oxide-based ordered mesoporous binary metal oxides for using UV-light and visible light simultaneously *via* nano-replication method. Photocatalytic activity was evaluated by decomposition of organic model dyes (Rhodamine 6G, B, and methylene blue).