

## Hybrid strategy of two different nanostructures for the development of visible-light-driven Photocatalysts

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We have been developing a variety of heterostructured visible-light-driven photocatalysts through hybrid strategies of two different nanostructures. Recently, new hybrid composite has been developed by hybridization of Ti-based metal-organic frameworks (Ti-MOFs) and ZnCr-layered double hydroxides (ZnCr-LDH). This hybrid composite were synthesized by growing Ti-MOFs in a colloidal suspension of ZnCr-LDH nanosheets. According to powder XRD and FESEM, the crystallinity and morphology of Ti-MOF after the hybridization with ZnCr-LDH became lower and irregular in comparison with pure Ti-MOFs. From the photocatalytic hydrogen production test under visible light irradiation ( $\lambda \geq 420$  nm), the hybrid composites showed an efficient photocatalytic performance much better than each component. Interestingly, such an efficient hydrogen production was achieved without a co-catalyst such as Pt. Additionally, the hybridization of two materials improves a photo- and chemical stability. In this talk, we will discuss in detail about synthesis procedure, structural formation, photocatalytic ability, and mechanism for the present photocatalysts.