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Controlling the shape of anatase nanocrystals for enhanced photocatalytic reduction of CO_2 to methanol

Quang Duc Truong, *[a] Huu Thu Hoa,[b] Dai-Viet N. Vo[cd] and Thanh Son Le[b]

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Herein, we report a simple thermal-induced synthesis of pyramidal anatase TiO_2 nanocrystals with exposed {101} and {001} facets with controlled shapes and truncated particles. Anatase phase of rod-like structures or truncated bipyramidal nanocrystals was prepared by tailoring the temperature or treatment time in a hydrothermal method using peroxotitanic acid as a precursor without using any shape-controlling reagent. The presence of both {101} and {001} facets in the synthesized nanocrystals enhances the separation of electrons and holes and improves the photocatalytic reduction of CO_2 to methanol.