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Porous ceramics based on hybrid inorganic tetrapodal networks for efficient photocatalysis and water purification

Jorit Gröttrup, Fabian Schütt, Daria Smazna, Oleg Lupan, Rainer Adelung, Yogendra Kumar Mishra

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Abstract

The present work demonstrates a very simple and unique strategy for efficient photocatalysis using ZnO ceramic nano- and microtetrapods synthesized by a flame transport synthesis approach. Due to their three-dimensional (3D) morphology, highly porous interconnected networks as flexible ceramics with sufficient mechanical strength can be easily fabricated and efficiently utilized in applications like e.g., photocatalysis, liquid filtering, and membranes. The photocatalytic response can be further enhanced by hybridization of the ZnO tetrapods with different metal oxides which has been explored in detail here. The Cu- and Bi- hybridized ZnO tetrapodal ceramic networks showed the least and highest photocatalytic activities against methylene blue, respectively, whereas, the others exhibited intermediate responses. The observed photocatalytic behaviors of pure and hybrid ZnO tetrapods based flexible ceramic 3D networks are briefly presented and discussed.