Electronic Supplementary Material (ESI) for CrystEngComm.

Supplementary Information

Surfactant assisted self assembly of Ag^+ containing nanocrystals and their facet dependent photocatalytic activity†

Sibsankar Rahut,[a] Soumya Shankar Basu,[a] and Jayanta Kumar Basu[a‡]

Department of Chemical Engineering, Indian Institute of Technology, Kharagpur-721302, India

Email: jkb@che.iitkgp.ernet.in

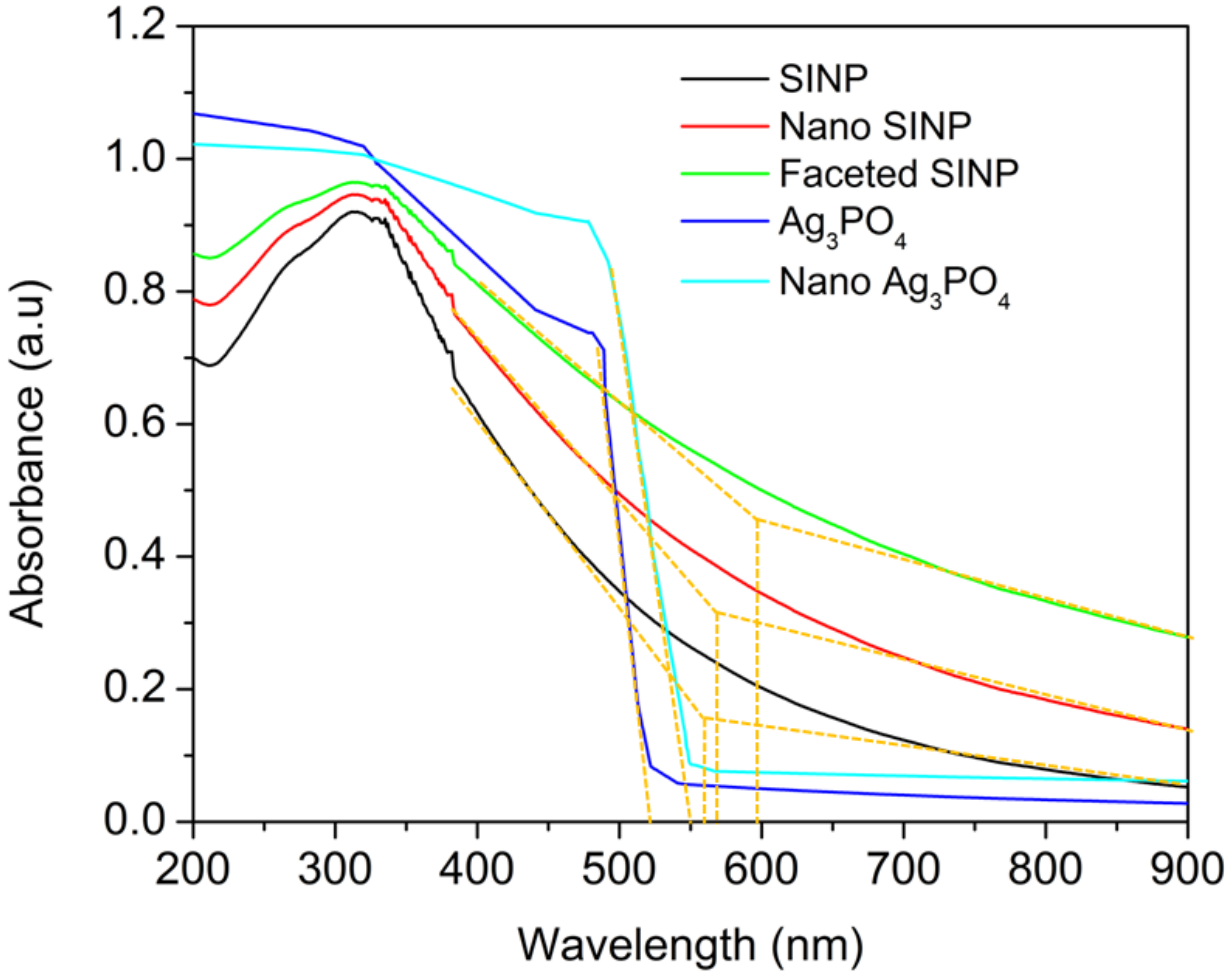

Figure S1: UV-VIS absorbance spectra of faceted nano SINP, nano SINP, SINP, nano Ag_3PO_4 and Ag_3PO_4

In agreement with the photocatalytic activity test, all the samples showed good absorbance in visible light range. Samples in bulk phase were initially dispersed in water to record the absorbance spectra. The Ag_3PO_4 samples showed an absorbance of 510 nm which corresponds to its band gap of 2.43 eV. The spectra of nano Ag_3PO_4 showed a yellow shift which can be attributed to electronic reconfiguration upon formation of nano particles. Similarly, all the SINP samples showed strong bands in the visible region. A strong orange shift was observed in case of the faceted SINP samples, which explains its highest photocatalytic activity. The band gaps of the synthesized samples have been calculated from the tangents of the band edges, as shown by the dotted lines in Figure S1. The band gaps of the samples are as follows: Ag_3PO_4 – 2.43 eV; nano Ag_3PO_4 – 2.21 eV; SINP – 2.17 eV; nano SINP – 2.13 eV; faceted SINP – 2.06 eV. Thus

faceted SINP has the narrowest band gap resulting in its maximum photocatalytic activity in visible light. Due to characteristic deformities in bulk phase, the optical band gap is slightly different from the theoretical band gaps of Ag_3PO_4 and SINP.

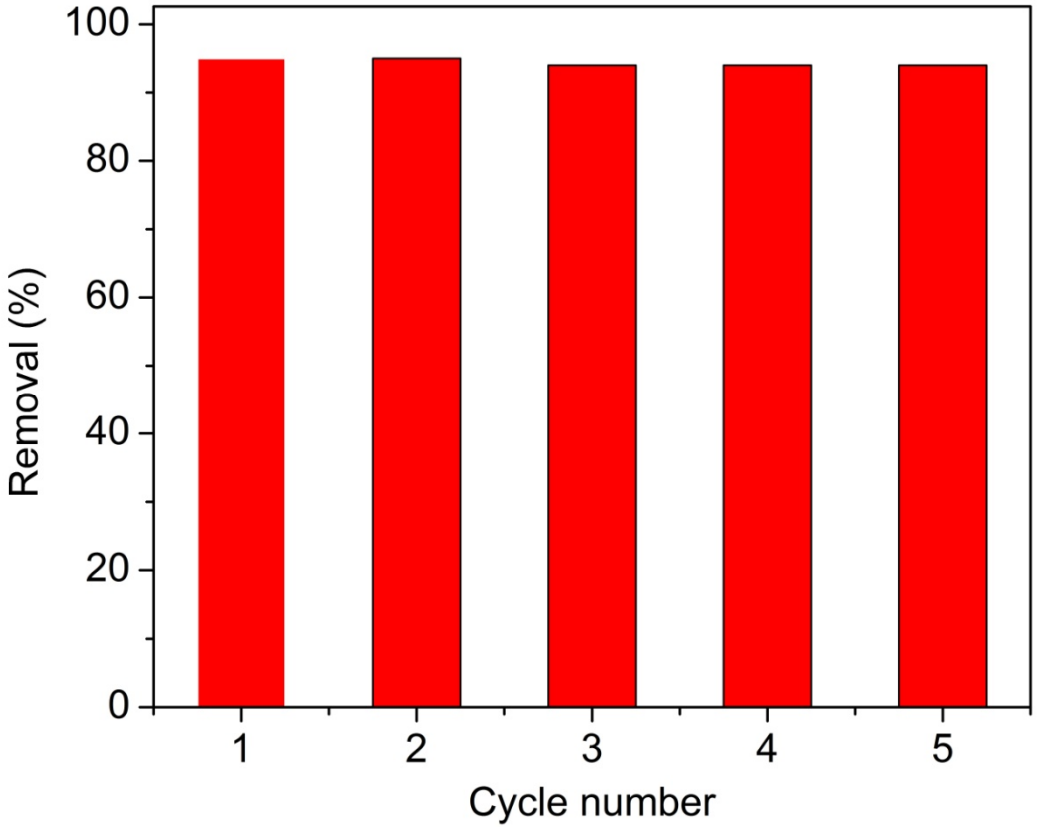

Figure S2: Photostability test of faceted nano SINP

The photostability of the faceted nano SINP samples have been tested to estimate its durability. The faceted SINP samples have been chosen since they exhibit most optimum photocatalytic activity. After each experiment, the nanocatalysts were centrifuged out, then washed thoroughly, and used in the same experimental setup. The nanocatalysts showed excellent degradation of above 95% in the first two cycles, as shown in Figure S2. Then the activity slightly decreased to 95% in third, fourth and fifth cycles. This reveals excellent photostability of the faceted SINP sample.

Blank experiment was also accomplished in absence of catalyst. It was observed that clioquinol degradation is infinitely slower with respect to the photocatalyst performance, as shown in Fig. S3.

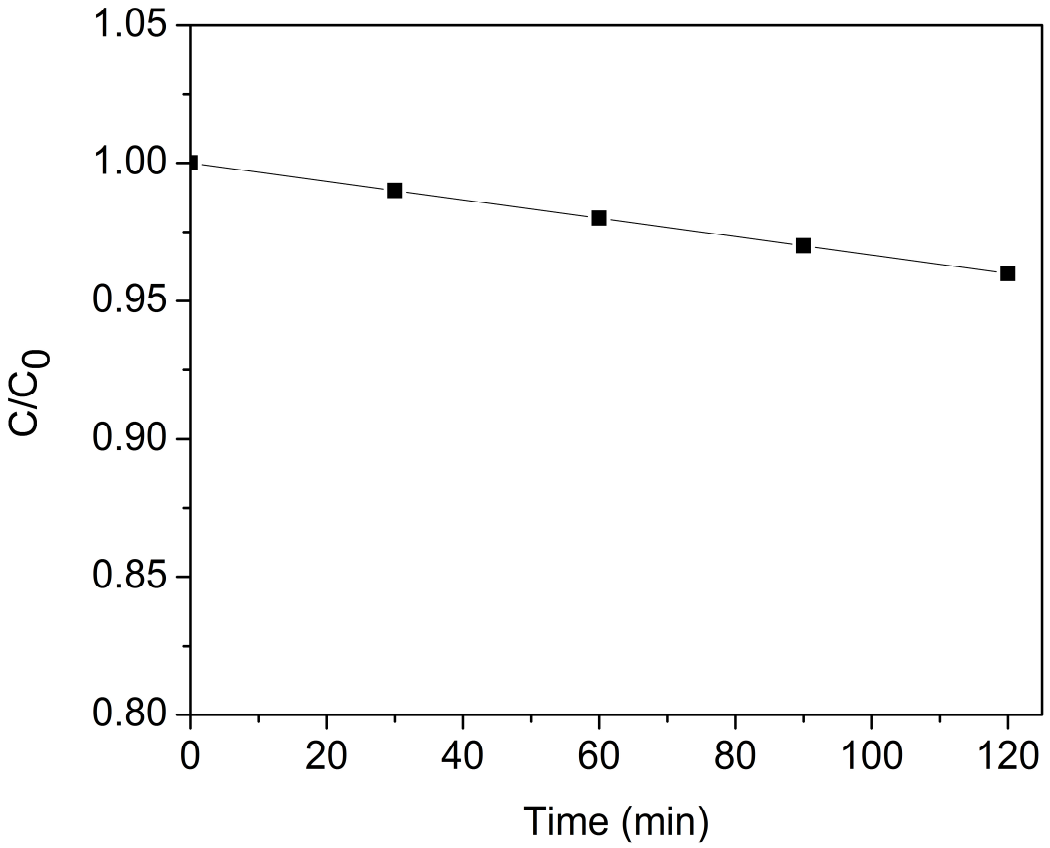

Fig.S3: Photodegradation in absence of catalyst