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¥ Supporting information

Plasmon induced enhanced photocatalytic activity of gold loaded hydroxyapatite nanoparticles for methylene blue degradation under visible light

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We performed MB degradation tests of pristine HAp and Au-loaded HAp both under visible and UV irradiation (please see the figure and tables below).

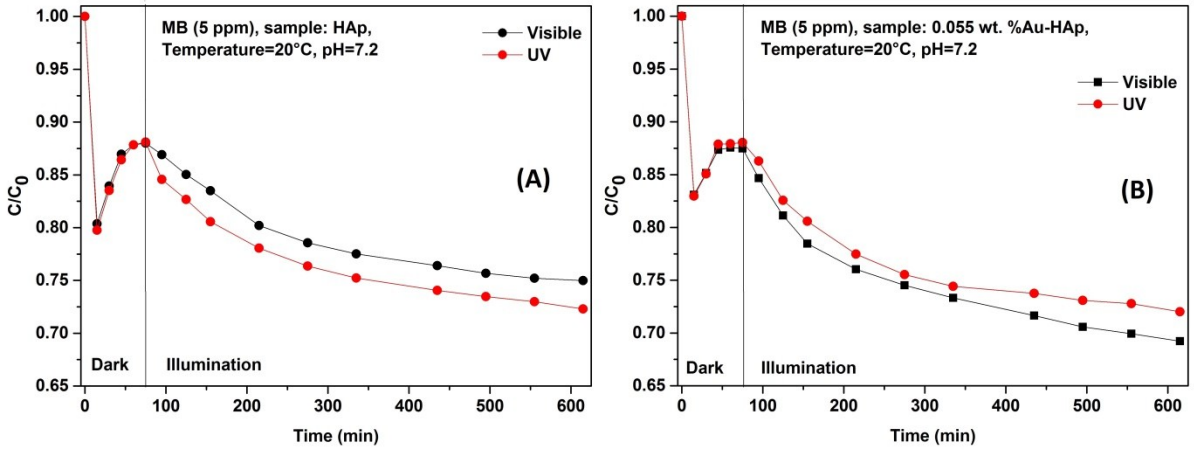

Figure S1. Photocatalytic degradation of MB by (A) HAp and (B) 0.055 wt. % Au-HAp catalyst under UV and visible light irradiation.

Table S1. Estimated MB removal (adsorption and degradation) efficiencies HAp at 20°C and solution pH 7.2 under UV and visible light irradiation.

Used radiation	MB adsorption (A) %	Photo-catalytic degradation of MB (B) %	Total MB removal (A+B) %
UV irradiation	12.12	16.53	28.65
Visible light irradiation	12.14	12.9	25.04

Table S2. Estimated MB removal (adsorption and degradation) efficiencies 0.055 wt. % Au-HAp at 20°C and solution pH 7.2 under UV and visible light irradiation.

Used radiation	Adsorption (A) %	Photo-catalytic degradation (B) %	Total removal (A+B) %
UV irradiation	11.86	15.17	27.03
Visible light irradiation	12.64	19.74	32.38

As can be seen from this figure S1 and tables (S1&S2), while under visible light irradiation Au-loaded HAp shows good photocatalytic activity (about 32.4 % MB removal), under UV light irradiation the photocatalytic activity of the sample is low (about 27 % MB removal). The photocatalytic activity of pristine HAp and Au-loaded HAp inverts on changing the illumination from UV to visible. The photocatalytic activity of pristine HAp decreases on changing the illumination from UV to visible; but the photocatalytic activity of Au-loaded HAp increases on changing the illumination from UV to visible. The results clearly demonstrate that the Au-loaded HAp is more active under visible spectral range, where the Au nanoparticles reveal their SPR absorption band.

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We performed photocatalytic tests of the pristine HAp and Au-loaded HAp samples under visible light irradiation at 50°C temperature of the reaction solution to investigate the photocatalytic performance of the catalysts at higher temperature.

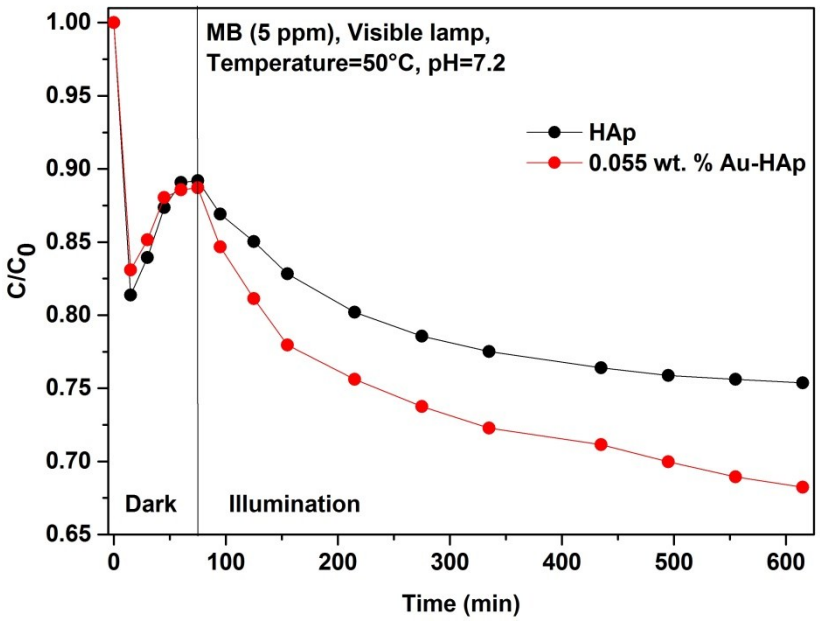

Figure S2. Photocatalytic degradation of MB by HAp and 0.055 wt. % Au-HAp catalyst at 50°C under visible light irradiation.

Table S3. Estimated MB removal (adsorption and degradation) efficiencies HAp and 0.055 wt. % Au-HAp at 50°C and solution pH 7.2, under visible light irradiation.

Catalyst (at 50°C temperature)	Adsorption (A) %	Photo-catalytic degradation (B) %	Total removal (A+B) %
HAp	11.86	13.95	25.81
0.055 wt. % Au-HAp	12.08	20.54	32.62

As can be noticed from the above figure and the table, on increasing the reaction temperature to 50°C, there was no noticeable change in the photocatalytic activity of either the pristine HAp or the Au-loaded HAp samples.