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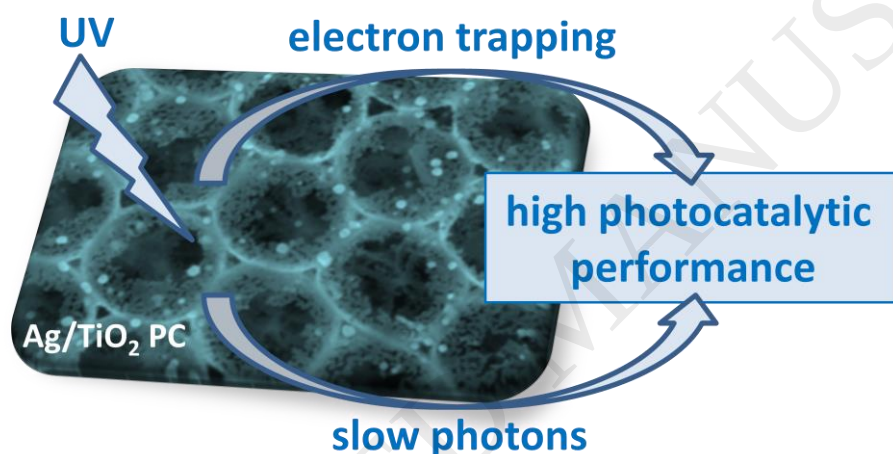
Evaluation of the synergistic effect between slow photons and electron trapping on the photocatalytic properties of TiO₂ photonic crystals

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Graphical abstract



Scientific highlights:

- We report the preparation of titanium dioxide photonic crystals (PCs) having two pore sizes: 238 nm and 327 nm.
- Electronic band gap (BG) and photonic band gap (PBG) were determined with the use of UV-Vis spectroscopy.
- The position of PBG was affected by the pore size of PC.
- Metallic silver (electron trapping centers) were generated on the surface of both types of PCs by a photoreduction of silver Ag⁺ ions.
- A strong synergistic effect in silver-modified TiO₂ photonic crystal, visible as an acceleration of rhodamine B photodegradation, was obtained by overlapping the edge of PBG with semiconductor BG combined with electron trapping provided by AgNPs.
- Photocatalytic properties of silver-modified TiO₂ photonic crystals were enhanced by synergistic effect caused by overlapping the edges of PBG and BG combined with electron trapping by AgNPs.

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