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Gold nanoisland-decorated TiO_2 for enhanced photocatalysis

P.M. Martins[1,2], Sandro Kapert[3], Le Nga[3], K. Kühn[3], G. Cuniberti[3,4,5], V. Sebastian[6,7] and S. Lanceros-Méndez[1,8,9]

[1] *Centre of Physics, University of Minho, 4710-057 Braga, Portugal*
[2] *Centre of Biological Engineering, University of Minho, 4710-057 Braga, Portugal*
[3] *Institute for Materials Science and Max Bergmann Center of Biomaterials,*
[4] *Dresden Center for Computational Materials Science (DCCMS), 01062 Dresden, Germany*
[5] *Center for Advancing Electronics Dresden, TU Dresden, 01062 Dresden, Germany*
[6] *Department of Chemical Engineering. Aragon INA, University of Zaragoza, Campus Río Ebro-EdificioI+D, C/ Poeta Mariano Esquillor S/N, 50018-Zaragoza, Spain*
[7] *CIBER de Bioingeniería, Biomateriales y Nanomedicina (CIBER-BBN), C/ Monforte de Lemos 3-5, Pabellón 11, 28029 Madrid, Spain*
[8] *BCMaterials, Parque Científico y Tecnológico de Bizkaia, Ed. 500, Derio 48160, Spain*
[9] *IKERBASQUE, Basque Foundation for Science, 48013 Bilbao, Spain*

Photocatalysis has become an attractive process to remove contaminants from aquatic environments [1], [2], being titanium dioxide (TiO_2) the most used catalyst. However, there are some drawbacks concerning the use of TiO_2, namely the reduced spectral activation, restricted to the UV spectral range (< 387 nm), which corresponds to just 3 to 4% of the solar spectrum. Moreover, the high recombination of electron-hole during photocatalytic process also hinders TiO_2 efficiency [2]. To overcome this limitation, TiO_2 nanoparticles are usually doped, functionalized with noble metals or produced as nanocomposites, to narrow TiO_2 band gap and reduce the electron-hole recombination. This work reports on the development of TiO_2 nanoparticles decorated with gold (Au) nanoislands. Pristine TiO_2 and the Au/TiO_2 nanocomposites were characterized as well as their photocatalytic degradation efficiency with a ciprofloxacin (CIP) solution (5 mg/L).
The results showed that Au nanoislands on TiO_2 nanoparticles surface enhances photocatalytic efficiency towards the pristine TiO_2 nanoparticles.

References:
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2. Uddin, M.N., et al., *An experimental and first-principles study of the effect of B/N doping in TiO2 thin films for visible light photo-catalysis.* Journal of Photochemistry and Photobiology A: Chemistry, 2013. **254**(0): p. 25-34

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Presenting author: Pedro Manuel Abreu Martins, *Universidade do Minho*, pamartins@fisica.uminho.pt