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# Speakers

- M. Saracoglu — Istanbul Technical University, Turkey
- Y. Schemm — Director, The Elsevier Foundation, The Netherlands
- M.L. Segatto — Federal University of São Carlos, Brazil
- M.N. Shaikh — King Fahd University of Petroleum and Minerals (KFUPM), Saudi Arabia
- S. Singh — IIT Delhi, India
- K. Staedtke — Friedrich-Alexander University Erlangen-Nürnberg, Germany
- A. Stavitskaya — Gubkin University, Russia
- E.B. Taboada — UNIVERSITY OF SAN CARLOS, The Philippines
- E.B. Taboada — UNIVERSITY OF SAN CARLOS, The Philippines; UNIVERSITY OF SAN CARLOS, The Philippines
- M. Tamtaji — The Hong Kong University of Science and Technology, Hong Kong
- S. Tin — Leibniz Institute for Catalysis, Rostock, Germany
- A. Todorovic — Montanuniversitaet Leoben, Austria
- V. Tola — University of Cagliari, Italy
- A. Tzani — National Technical University of Athens, Greece

## Presentation

WED, 11:25 - 11:45

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### [O7.2] Photoactive nanoparticles templated on natural nanotubes for visible light induced bacteria degradation

**VIEW ABSTRACT (TEXT ONLY)**

Bacteria resistance is a growing problem and new materials should be engineered and investigated to face this problem. Biocompatibility of antibacterial nanomaterials plays a crucial role in their sustainable application. In this work we developed a new strategy for synthesis of low toxic antibacterial materials with nanoparticles of various compositions (CdS, Ag, Ag/CdS) templated on natural aluminosilicate nanotubes (halloysite) by *in situ* formation via ligand linkage. Ag nanoparticles with size from 5 to 30 nm were obtained using tannic acid or sodium borohydrate as reducing agent. CdS and Ag/CdS with size from 5 to 10 nm were stabilized on halloysite using azines as complexing agent to prevent particles from aggregation and rapid photodegradation that usually occur in pure CdS. Metal content in materials does not exceed 5 wt.%.

We have compared the antibiotic activity to Gram-positive and Gram-negative both under visible light irradiation and in the dark to conclude the dominant effect of photodegradation of bacteria. It was found that Ag particles template on clay nanotubes are more active to *S. marcescens, Ps. aeruginosa, A. baumanii* than CdS quantum dots (QDs) synthesized on clay tubes when exposed to visible light irradiation. From the opposite QDs were much more efficient in inhibition of *St. aureus* growth under visible light.

Toxicity of new materials was studied on human cancer cells and showed that more than 80% of cells are alive in all cases. *In vivo* studies were performed on *Caenorhabditis elegans* nematodes. No negative effect on living was observed.

Proposed materials are easily scalable and could be used in the paints and coating to prevent microorganisms growth and biofouling. Due to low toxicity on eukaryotic cells and no negative effect on nematodes they could be potentially applied for medical applications. This work was supported by the Ministry of Education and Science of the Russian Federation, Grant No 14.Z50.31.0035