

## **Synthesis and characterization of zinc-oxide nanostructures for application in cultural heritage**

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Zinc oxide (ZnO) structures possess multiple and versatile properties that make it promising in many fields of research such as optics, electronics and biomedicine. Among these, zinc oxide microstructures are historically well-known for its antimicrobial activity, mainly due to the release metallic ions. Moreover, nanostructures of zinc oxide are particularly suitable for biomedical applications thanks to the high S/V ratio, which guarantees greater presence of surface atoms and therefore maximum contact with the external environment. It is, in fact, well-known that these materials can inhibit or kill bacteria through a physical interaction that involves penetration of cell membranes leading to the interruption of the intracellular processes translating in a high reactive and antibacterial activity. In this work, it is proposed one low cost and easy scalable production process and the final characterization of the obtained materials. Nanorods (NRs), Nanowalls (NWs) and Microrods (MR) are obtained by hydrothermal process where many process parameters have to be controlled to the discrimination of the various nanostructures. The scope of this talk is to provide an insight on production and characterization of ZnO-based nanostructures produced in the Sapienza Nanotechnology and Nanoscience Laboratory, and their potential exploitation in patented products for application in the field of cultural heritage.