Nanomaterials Based on Metal Oxides for Environmental and Cultural Heritage Protection

Metal oxide nanomaterials, particularly silicon and titanium dioxide (SiO_2 and TiO_2), offer promising solutions for environmental remediation and the conservation of cultural heritage. This talk will discuss our recent work on the eco-friendly synthesis of TiO_2 nanoparticles via a low-temperature microemulsion process. These nanoparticles exhibit enhanced photocatalytic properties, enabling effective degradation of pollutants and providing self-cleaning coatings for architectural surfaces. Our research highlights the use of TiO_2 in protecting stone monuments from soiling and biological growth, reducing the need for harsh cleaning methods. We will also present findings on optimizing synthesis parameters to improve the photocatalytic efficiency of these materials, making them highly effective in both environmental applications and the preservation of cultural heritage. This presentation underscores the potential of nanotechnology in contributing to a cleaner environment and safeguarding our cultural legacy.