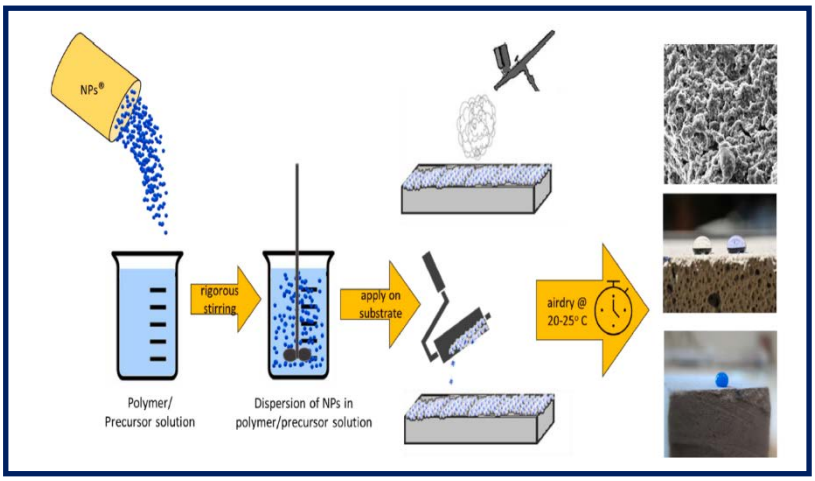
Process Know- How for Manufacturing of Cu-TiO_2

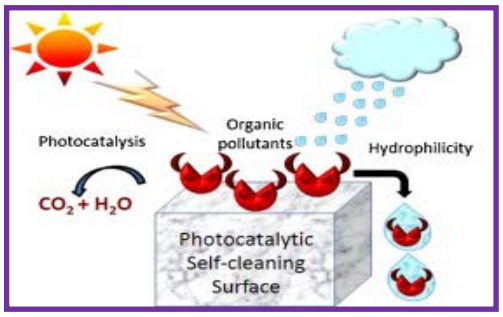
Technology in Brief:

Copper – doped TiO_2 nanoparticles were synthesized via the sol-gel method to improve photocatalytic performance for cultural heritage protection. A titanium precursor (e.g., titanium isopropoxide) was dissolved in alcohol under constant stirring. A calculated amount of copper salt was separately prepared and added dropwise to achieve the required doping concentration. Controlled hydrolysis was initiated by slow water addition, leading to gel formation through condensation reactions. The gel was aged, dried, and calcined to obtain crystalline Cu-doped TiO_2 nanoparticles. The particles were characterized using XRD, FESEM, and TEM to confirm phase, morphology, and size. Finally, the nanoparticles were dispersed B-72 to develop durable nano- coatings for marble, sandstone, and granite protection.

Salient Features/Advantages:

- 70-80% increase in hydrophobicity in coated samples as compared to uncoated samples
- Excellent durability with retention in hydrophobicity up to 93%.
- Color variance of coated samples range between 1.2-4.4 which is under acceptable limit of 5
- Crystalline Phase Optimization
- Multi-Substrate Applicability





End Product (s)	Cu-doped TiO_2 Nano-powder, Nano-Coating Formulation (Cu–TiO_2/B-72 Composite),
TRL	5
Environmental Impact	Reduction in Chemical Cleaning Agents, Air Purification Potential
Setup– Equipment required	Jacketed Agitator Vessel with temp. Control, muffle furnace, grinder
Material Composition	Most historic monuments are made of stone.