

# Nanosciences & Nanotechnologies towards SDGs & Science with social impact

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## Abstract:

As per today, ~55% of the world's population lives in urban areas. It is projected that it would reach ~2.5 billion by 2050, with ~90% of this increase in Asia & Africa. With such an upsurge of urban population and climate change increase of the average seasonal atmospheric temperature, several SDGs challenges will have to be overwhelmed. In this regard, STI and R&D are a potential bridge in addressing such challenges within the energy, water & health nexus. In the energy sector, Vanadium based thermochromic nano-coatings are ideal for smart windows applications regulating solar heat radiations with zero energy-input (Green air-conditioning) [1]. Likewise, nano-fluids as a new generation of superior coolants would play a major role in waste heat recovery as well as drug delivery[2-4]. In addition, it was recently validated that CO<sub>2</sub> can be used to bio-engineer several multifunctional carbonates. These latter exhibited effective fertilizing response, and, a high reflective properties equivalent of radiative cooling paint as well as a significant porosity/hardness as a potential Supplementary Compound Material (SCM) for cement industry [5].

This contribution is intended to highlight on the above-mentioned properties in line with UN-SDGs vision & mission.

[1]. "Towards Room Temperature Thermochromic Coatings with controllable NIR-IR modulation for solar heat management & smart windows applications"  
<https://www.nature.com/articles/s41598-024-52021-7> ,

[2]. "A novel approach for engineering efficient nanofluids by radiolysis"  
<https://www.nature.com/articles/s41598-022-14540-z>

[3]. "Remarkable thermal conductivity enhancement in Ag—decorated graphene nanocomposites based nanofluid by laser liquid solid interaction in ethylene glycol"  
<https://www.nature.com/articles/s41598-020-67418-3>

[4]. " Thermal conductivity enhancement in gold decorated graphene nanosheets in ethylene glycol based nanofluid"  
<https://www.nature.com/articles/s41598-020-71740-1>

[5]. " Room temperature bio-engineered multifunctional carbonates for CO<sub>2</sub> sequestration and valorization"  
<https://www.nature.com/articles/s41598-023-42905-5>

