MOST
Microporous Oxides Science and Technology

Self-Cleaning Ceramic Coating for Solar Panels

Problem: Soiling is a challenge for Solar Energy

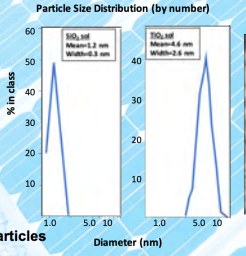
- Dirt lowers solar power by 15% or more.
- Cleaning panels is costly.
- Cleaning requires a significant amount of water.
- Existing organic coatings need to be reapplied every 2 to 5 years.

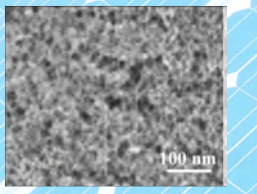
Solution: MOST Anti-soiling and self-cleaning coating for solar panels

- Metal oxide nanoparticle suspensions → transparent thin film (< 1 μm)
- Cures and hardens when exposed to UV light.
- Negative surface charge discourages soiling
- Photocatalytic to degrade organic contaminants
- Hydrophilic to promote adhesion and the cleansing effect of rain
- Single application ceramic coating is durable and lasts longer than competing organic coatings

SiO_2 TiO_2

Light scattering by nanoparticles





Plan: Collaborate with a US-based manufacturer of solar panels to integrate the MOST coating technology into their manufacturing process.

Ready! Spray coat commercial solar panels with our connector Madison College and field test to quantify their effectiveness.

Set! Characterize thin film coating properties (thickness, uniformity, reflectivity, durability) at DOE laboratories. Extend testing of coated panels to arid climates, (e.g., New Mexico) and humid climates (e.g., Florida).

Go! Develop robust and statistically significant data demonstrating the coating's performance, in order to partner with a US solar panel manufacturer to commercialize the MOST self-cleaning technology

Team Led by former professors and scientists from the University of Wisconsin, MOST has over 20 years of experience with aqueous nanoparticle suspensions. Madison Area Technical College is a national leader in solar photovoltaics and is serving as our American Made Solar Prize Connector.. The college operates the largest rooftop PV system in Wisconsin and works with numerous solar contractors through its renewable energy industry advisory board.

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AMERICAN MADE SOLAR PRIZE
U.S. DEPARTMENT OF ENERGY