

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

High Surface Area Nanoporous TiO₂ Coating for Effective Water Condensation.¹ MEHMET BURAK KAYNAR, SNTG Lab. Physics Engineering Dept. Hacettepe Uni. Turkey, MARK MCGARITY, Mechanical Engineering Department Villanova University, USA, EMRE YASSITEPE, S. ISMAT SHAH, Department of Materials Science and Engineering, University of Delaware, Newark, DE 19716, United States — A water collection device utilizing nanoparticles has been researched, towards the possible goal of providing water in much needed areas on Earth. Titanium dioxide nanoparticles were spray coated on stainless steel substrates to measure their effect on atmospheric water condensation. A simple thermoelectric cooler, also called a Peltier device, was used to lower the temperature of the coated and uncoated stainless steel substrates to below the dew point temperature of the surrounding air. The thickness of the spray coating was varied to measure its effect on water condensation. This increase in surface area had a direct effect on the amount of water condensed. Compared with bare stainless steel, the TiO₂ spray coated stainless steel had a considerably smaller contact angle of H₂O droplets. In addition, the super-hydrophilic properties of TiO₂ allowed water to flow more easily off the device.

¹Supported by TUBITAK-BIDEB 2214–Abroad Research Scholarship program.

Mehmet Burak Kaynar
SNTG Lab. Physics Engineering Dept. Hacettepe Uni. Turkey

Date submitted: 26 Nov 2012

Electronic form version 1.4