Title: Nanoparticle Fate and Transport in Conventional Water Treatment

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Abstract: Ongoing work is focused on establishing the capacity of nanomaterials to be transported through domestic water treatment. Specifically our efforts seek to establish the extent to which nanomaterials are removed in conventional water treatment processes and to identify the mechanisms leading to their removal in engineered aquatic systems. The treatment processes that are considered include coagulation, flocculation, sedimentation, and filtration. Titanium dioxide nanoparticles, both bare and coated, are being used as a model particle and are evaluated for removal capacity in these critical stages of treatment. A combination of traditional and scaled-down jar tests are being used to identify the removal capacity of TiO_2 in representative source waters and to establish the influence of particle coating, natural organic matter, and coagulant aids. For the filtration studies, experiments are being conducted in packed beds and a 2-D micromodel flow cell to quantify the removal of nanoparticles under a range of relevant chemical and physical conditions. Understanding both the mechanisms and capacity of existing infrastructure to effectively remove them before distribution is important to ensure that society has safe and potable drinking water.

“Key highlights of your bio”: John Babbage Chair in Environmental Engineering, Fulbright Scholar 2009-2010 at Ben Gurion University in Israel, 2010 NSF Career Award Winner