Water Filter Made with Iron Based Materials: Mitigation of Arsenic and other Toxic Species from Groundwater

Dr. Abul Hussam

Center for Clean Water and Sustainable Technologies
George Mason University, Fairfax, VA 22030, USA. ahussam@gmu.edu

Clean potable water is a matter of life. It is estimated that at least 250 million people in the world are drinking groundwater containing toxic levels of arsenic. The prolonged drinking of this water has caused serious illnesses in the form of hyperkeratosis on the palms and feet, fatigue symptoms of arsenicosis, and cancer of the bladder, skin and other organs. Arsenic in drinking water is primarily present as inorganic species: H$_2$AsO$_4^-$, HAsO$_4^{2-}$, and H$_3$AsO$_3$, where arsenite (H$_3$AsO$_3$) is the most toxic, the most mobile, and the most difficult to remove species. This presentation covers the development of simple arsenic filters based on iron metal. Some basic properties such as removal capacity based on sorption isotherm, sorption kinetics, and mass transfer characteristics of composite iron granules (CIG) - the precursor of composite iron matrix (CIM) are discussed. CIM based water filters also remove other toxic metals (Mn, Pb, Cd, Cu, etc). Field and laboratory experiments also showed CIM based filters can remove 99.995% MS2 bacteriophage virus and 92-99% viable fecal coliform from water. Thus, CIM technology produces a versatile water filter. The filter passed through several environmental technologies verification programs for arsenic mitigation (ETVAM) projects. SONO filter also received the 2007 Grainger Challenge Prize for Sustainability from the US National Academy of Engineering. Presently, more than 300,000 SONO filters are deployed in remote arsenic-affected areas.

Date: Friday, April 6, 2018
Time: 11:00 a.m. to 12:00 p.m.
Location: DM-100, MMC (Live)
Marine Sciences Building Room 105 (MSB-105) – BBC (via Polycom)