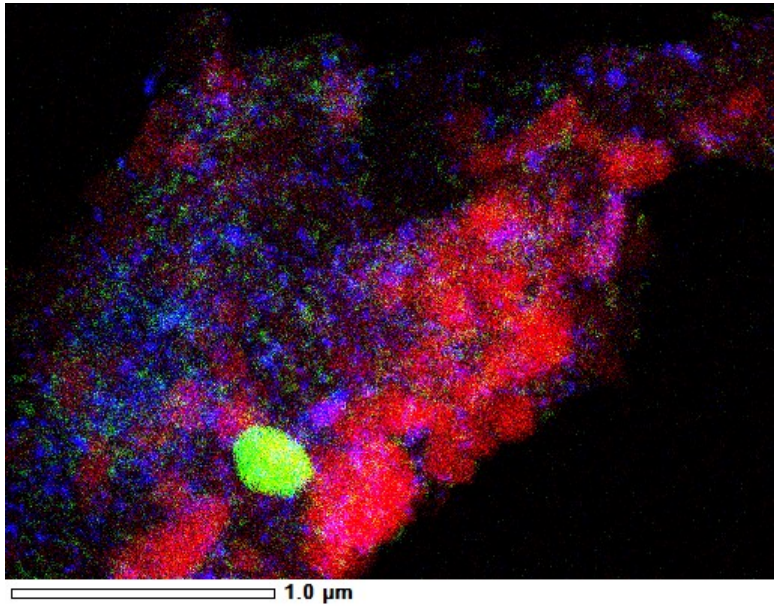
Detecting Titanium Oxide Engineered Nanoparticles in Urban Water Runoff

Efforts to quantify the release of anthropogenic engineered TiO_2 nanoparticles into the environment have been hampered by the inability to distinguish natural from engineered nanoparticles. This research proposes to use the Nb to Ti ratios associated with naturally occurring TiO_2 to isolate the fractions of natural and engineered nanoparticles collected. The water sampled from Ballona Creek, CA was filtered and size fractionated prior to ICP-MS and further analyzed with HRTEM and STEM / EDS mapping to determine particle morphology. The TiO_2 particles were generally observed to range in size from 50-150 nm. TiO_2 is the most abundant engineered nanomaterial produced globally.



STEM / EDS mapping of pollutants sampled from Ballona Creek, CA with maps of Ti (green), Zn (blue), & O (red).

Baalousha, M., J. Wang, M. Nabi, F. Loosli, R. Valenca, S. K. Mohanty, N. Afrooz, E. Cantando and N. Aich (2020). "Stormwater green infrastructures retain high concentrations of TiO2 engineered (nano)-particles." Journal of Hazardous Materials 392: 122335. Work performed at Virginia Tech National Center for Earth and Environmental Nanotechnology Infrastructure (NanoEarth).

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