

B101-006

Room: 302

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Toxic Nanoparticles in the Atmospheric Environment

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Particulates emitted from coal-burning power plants typically contain very small amounts of uranium (less than 10 ppm). Due to the extremely low concentrations, the form of the uranium has been unknown. Using a variety of advanced electron microscopy techniques, we have identified for the first time nanocrystals of uraninite, UO_{2+x} , encapsulated in carbonaceous matter (smaller than 50 nm) similar to fullerene. We have also identified, for the first time, closely associated fullerenes, C_{60} . The 'carbon-caged' nanocrystals of uraninite are protected from the immediate oxidation that would lead to increased mobility of uranium in the environment. Still, the presence of uranium in the very fine fraction of atmospheric particulates provides another pathway for radiation exposure.