

Recent advances and fate of nanocomposites for environmental applications

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With ever-increasing human population, depleting natural resources, and rapid climate change, the role of energy is becoming more crucial in addressing these issues and establishing systems for nature and humans. Nuclear energy today, the release of radionuclides from the long-term use of nuclear fuels and occasional nuclear disasters, such as at Chernobyl and the Fukushima Daiichi nuclear power plant, are an emerging issue. In particular, radioactive cesium, a fission product formed in nuclear reactors, is a problematic contaminant owing to its high radioactivity, relatively long half-life time and bioavailability. A variety of materials/engineered nanocomposites have been investigated for removal of radioactive cesium, including polymers, zeolites, clay minerals, silica, nanoparticles, and Prussian blue. Herein, recent efforts in our research group, utilizing both organic and inorganic composites safe design and fabrication to aiming at reducing their impact on the environment and nature, to address key issues to such an end-of-life of nanocomposites are described. And it will be introduced based on recent advances and fate of nanocomposites for environmental applications.