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APPLICATION OF NANOSORBENTS FOR ENVIRONMENTAL REMEDIATION IN NUCLEAR TECHNOLOGY: ADVANTAGES AND LIMITATION

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Increasing electricity demand and environmental problems such as global warming force the countries to use more clean energy sources. Nuclear related activities are also ongoing in our country. Turkey is a one of the newcomer. For the safe operation of the nuclear power plants, potential sources of hazards should be defined and all required measures should be taken from the design stage to decommisioning stage.

Environmental contamination with radioactive ions that originate from the processing of uranium or the leakage of nuclear reactors is a potential serious health threat because it can leach into groundwater and contaminate drinking water supplies for large population areas. The key issue in developing technologies for the removal of radioactive ions from the environment – mainly from wastewater – and their subsequent safe disposal is to devise materials which are able to absorb radioactive ions irreversibly, selectively, efficiently, and in large quantities from contaminated water. The property of the nanosorbents to permanently trapping radioactive cations makes them an ideal absorbent to remove them from contaminated water, while the used sorbents can be disposed safely without having to risk a release of the absorbed cations from the absorbents which may cause secondary contamination.

Although various nanomaterials can be applied, selection of the most suitable nanoadsorbent in removing target pollutants depends on the characteristics of effluents to be treated, technical applicability, discharge standards, cost-effectiveness, regulatory requirements, and long-term environmental impacts. Due to their ability to minimize the generation of secondary waste using less resources and capability of removing any types of pollutants from contaminated water effectively, it is anticipated that nanoadsorbents would play major roles in protecting the aquatic environment in the future. By addressing the long-term sustainability of resources today through the applications of nanomaterials for environmental remediation, the world may have a green environment tomorrow, in which humans can coexist with the nature.

In this presentation, it has been primarily focused on the application of nanoadsorbents in the environmental remediation in nuclear technology. Then the applications of different NPs and other nanomaterials are discussed. Also their advantages and drawbacks in the applications are evaluated.

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