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Study of materials for improved adsorption of xenon at IMS radionuclide stations

A crucial part of the verification system of the CTBT are the radioxenon monitoring systems that are monitoring the atmosphere for potential xenon releases from nuclear explosions. The efficient adsorption and desorption of radioxenon in adsorbent materials is essential for the detection capability of these systems. Recent studies on xenon adsorption in porous materials have shown promising results for the further improvement of the detection capability of the IMS noble gas systems. In the framework of the two previous EU JA programs, SCK•CEN developed a laboratory set-up to perform breakthrough experiments on different adsorbent materials and developed a model for the simulation of the adsorption process. Although this research was in another context, it was obvious that the studies performed and the methods developed were also very promising for xenon monitoring purposes. The SCK•CEN has been contracted by the CTBTO under the EU JA VII program to perform a fundamental study of xenon adsorption materials (activated carbons, silver doped zeolites, metal-organic frameworks) for a more efficient noble gas monitoring at IMS stations, which could be translated in lower detection limits or shorter collection and processing times. The project as well as the first results will be presented.

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