

Enriched Argon from an Air Mixture by Pressure Swing Adsorption Method

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This work presents the results of the development and experimental investigations of the sampling unit of the automated system for monitoring the Ar-37 content in the soil and the surface atmosphere. The adsorption and separation characteristics of materials for air separation and argon extraction from an air sample by the volumetric method have been studied. CaA (5A), PSA/VPSA (13XHP) NaX (13X), ZSM-5, and Ag-ZSM-5 zeolites, as well as coconut charcoal and activated charcoal were used as materials. Adsorption isotherms of the main air components (Ar, N₂, O₂) on these sorbents at room temperature in the pressure range from 0 to 10 bar were obtained. Based on the study, a two-stage system of pressure swing adsorption was created to obtain enriched argon. The argon concentration in the enriched flow was measured as a function of the filling, blowing, discharge, and regeneration times, sorbent types, and adsorber volumes.

Promotional text

The development solves the problem of creating an energy efficient sampling unit for Ar-37 detection systems for the purpose of monitoring and verifying underground nuclear tests.

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