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# Decontamination of spent ion-exchangers contaminated with cesium radionuclides using resorcinol-formaldehyde resins

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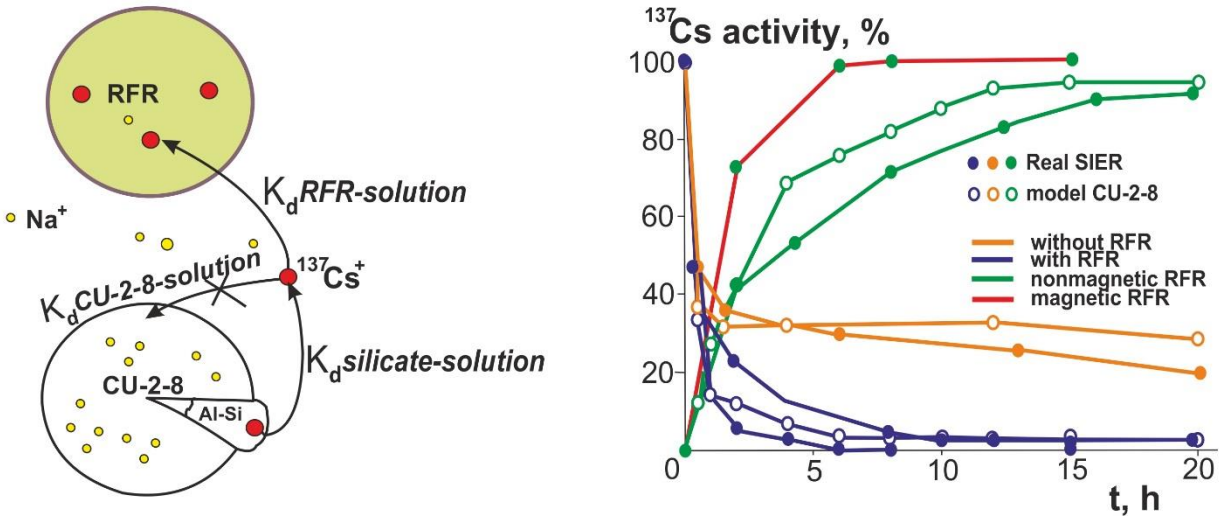
## Graphical abstract




## Highlights:

- Cesium radionuclides not removable by regeneration are bound to silicate deposits.
- Application of RFR substantially increases cesium desorption from an ion-exchanger.
- The radwaste volume was reduced at least 2-fold for zeolites and 10-fold for SIER.
- The distribution coefficient values for RFR were high ($K_d$>$10^4$) after 6 regenerations.
- The volume of secondary waste formed after regeneration of RFR was reduced 600-fold.

**Abstract:** The origin of the emergence of radioactive contamination not removable in the process of acid-base regeneration of ion-exchange resins used in treatment of technological media and liquid radioactive waste streams has been determined. It has been shown that a majority of cesium radionuclides not removable by regeneration are bound to inorganic deposits on the surface and inside the ion-exchange resin beads. The nature of the above inorganic inclusions has been investigated by means of the methods of electron microscopy, IR spectrometry and X-ray diffraction. The method of decontamination of spent ion-exchange resins and zeolites contaminated with cesium radionuclides employing selective resorcinol-