

Crystalline Silicotitanate (CST) Ion Exchange to DWPF - DWPF Vitrification

The proposed process would employ the crystalline silicotitanate (CST) resin to remove Cs from the salt solution. There may also be some level of decontamination of Sr, Pu, and U from the salt solution. If Sr, Pu and U are not adequately removed, monosodium titanate (MST) could be added to sorb these radionuclides. Since the radionuclides cannot be eluted from the CST resin, the loaded resin would be transferred to the DWPF to be combined with sludge and frit to produce borosilicate glass. The decontaminated salt solution would go to the Saltstone Facility to be made into a Class A grout after treatment to remove Hg.

The process would include these steps: MST addition to remove Sr, Pu, U. Filtration to remove sludge and MST solids from the salt solution and prevent plugging of ion exchange (IX) columns. The solids would be transferred to DWPF via the sludge stream. Treatment in a CST IX column(s) with the Cs loaded CST (including Sr, Pu, U) slurried to the DWPF. The decontaminated salt solution would be transferred to Hg removal (GT73) and then to the Saltstone Facility to produce a Class A waste.

Variations:

- 1) A series of "batch & stir" CST removal steps (tanks) could be employed instead of the CST IX column(s).
- 2) The CST resin could be combined with the sludge stream instead of being fed in a separate stream.

Merits:

- 1) Non-hazardous inorganic reagent
- 2) High efficiency Cs removal
- 3) Direct incorporation of CST into glass minimizes waste volume relative to Zeolite
- 4) Eliminates DWPF salt cell operation
- 5) Reduced volume of glass based on potassium going to saltstone

