

Center for Glass Research (CGR)

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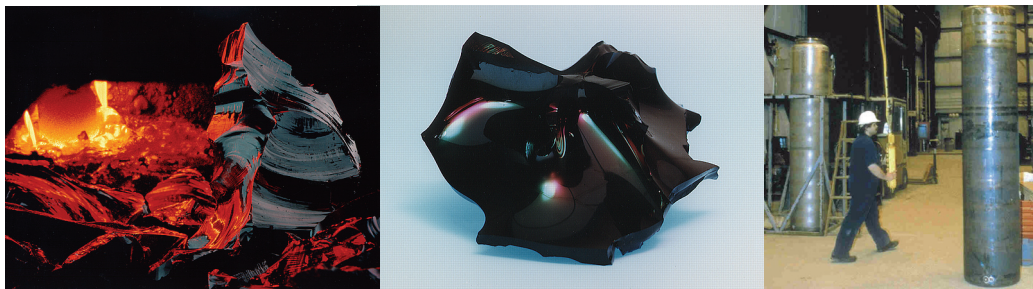
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Glass for Toxic Waste Encapsulation

Specialized glasses and glass melting processes are at the heart of toxic waste vitrification, particularly of low-level and high-level radioactive waste, for long-term storage. Collaborative CGR research at Alfred University, the Virginia Military Institute and at the University of Washington's "Center for Process Analytical Chemistry (CPAC)" resulted major insights into understanding the oxidation state of such glass melts, including the degree and mechanism of mutual interactions (oxidation-reduction reactions) among the many multivalent elements present. This work is at the heart of understanding and predicting chemical durability of the glass, which is essential for assuring long-term stability during underground storage. Results have been found extremely valuable by at least one of our member companies, the Westinghouse Savannah River Company, and several national laboratories involved with nuclear waste vitrification.



Waste vitrification chemically processes heavy metals and radioactive elements into a durable, leach-resistant glass, which is then placed into a canister. Images courtesy of Pacific Northwest National Laboratory.

Economic Impact: This technological advance contributed essential technical knowledge that has helped the nation and the world deal with the nearly intractable dilemma of what to do with the vast amounts of nuclear waste produced by modern society. The economic impacts of this incredibly important innovative technology are undoubtedly huge but almost impossible to quantify.

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