Small Glass Melter Test Facility

Background

This facility was installed to conduct fundamental tests concerning the vitrification process of a reprocessing plant, where liquid waste containing high-level radioactive material (high-level liquid waste) is consolidated into the chemically stable glass matrix.

In particular, the observation of the behavior of the cold cup on the glass melting pool is the primary objective of this equipment, where dried waste is slowly mixed with the molten glass. As the condition of the cold cup could affect the glass production rate and the properties of the produced glass, the effect of the glass melting speed or the control of temperature on the cold cup condition is closely studied.

The stabilization of the cold cup condition is considered to be most important factor in the glass melter's operation, and the results obtained at this facility will be useful for the reprocessing plant.

Outline

Using this facility, several types of basic data will be obtained concerning the chemical reaction generated in the cold cup in the glass melter in which the high-level liquid waste is consolidated into the glass matrix, and the main component is the lab-scale small glass melter into which the simulated waste solution and glass material can be continuously fed.

The material of the glass melter is made from the same brick as that of the actual melter, and glass is heated using Joule heating (electric current is passed directly into the molten glass). The simulated liquid waste and glass material can be fed together, and the cold cup can be generated on the molten glass pool. A sample of the cold cup can be obtained without stopping the melting operation.

Specifications

Type of glass melter: Liquid-feed Joule heating ceramics melter (LFCM)
Brick materials that contacts molten glass: Monofrax K-3
Electrode material: NCF690 (Inconel alloy)
Casing: sus304
Surface area of molten glass: 0.0225 m^2 (150 mm × 150 mm)
Depth of molten glass: Low level 132 mm, high level 150 mm
Operating temperature: 1,150℃ (max: 1,200℃)
Feed: Continuous type
Glass drain: Batch type

【Installed location and date】

Komae area/February 2012

Photo: Small glass melter test facility