

International Conference on the Safety of Radioactive Waste Management, Decommissioning, Environmental Protection and Remediation: Ensuring Safety and Enabling Sustainability



Contribution ID: 166

Type: POSTER

PLASMA TREATMENT OF A SIMULATED LOW-LEVEL RADIOACTIVE WASTE

According to PNGRR (2020), 90% of the radioactive waste produced in Argentina is low-level waste. Since these materials occupy a lot of space, treatment techniques have been developed to manage them efficiently. One of these techniques is thermal plasma gasification, which involves heating up waste in a special oven using ionized gas. The process's high temperatures enable the treatment of a wide range of materials, resulting in a volume reduction of nearly 100% (Ojovan, 2011). This work presents an experiment on gasification by thermal plasma using a simulated low level radioactive waste (SLLW) to analyze its volume reduction and reaction products. The experiments were conducted at Nuclear Materials Department (CNEA) (Pullao, 2021; Rivero, 2017). The SLLW had an initial volume of 9000 cm³, consisting of nitrile gloves, laboratory paper, and chemical compounds of stable metals Co, Sr, Cs, and Ce to simulate the presence of radioisotopes Co-60, Sr-90, Cs-137, and Ce-144. The volume reduction obtained was 99.6% (34.4 cm³), and the ashes inside the reactor contained Co, Sr, Cs, Ce, and Cl, along with crystalline phases CuCl, Cu₂O, ZnO, TiO₂, CuSO₄, CuO, ZnS, and TiZn₂O₄.

Ojovan, M. (2011). Incineration and plasma processes and technology for treatment and conditioning of radioactive wastes. En M. I. Ojovan, Handbook of advanced radioactive waste conditioning technologies. Cambridge: Woodhead Publishing Limited.

Programa Nacional de Gestión de Residuos Radiactivos (PNGRR). 2020. Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. Seventh Report. National. Argentinian republic.

Pullao, J. A., (2021-2022). Scholarship Report: Simulated radioactive waste pre-conditioning process using thermal plasma gasification. Nuclear Energy Technological Applications Area Management. Nuclear Materials Department. Division: Medical and Industrial Applications. Scholarship directors: Ing. Franco Emmanuel Benedetto and Dr. Diana Carolina Lago.

Rivero, R. E., (2016-2017). Treatment of radioactive waste through thermal processes. Nuclear Energy Technological Applications Area Management. Nuclear Materials Department. Division: Fuels and Waste. Scholarship directors: Dr. Miguel Oscar Prado and Ing. Franco Emmanuel Benedetto.

Primary author: PULLAO, Juan (National Atomic Energy Commission - Bariloche Atomic Center)

Co-authors: Mr BENEDETTO, Franco Emmanuel (Comisión Nacional de Energía Atómica); Ms PAUCAR CORADINI, Irina (Universidad Nacional del Litoral); Mr POBLETE NEIRA, Leonardo (Comisión Nacional de Energía Atómica)

Presenter: PULLAO, Juan (National Atomic Energy Commission - Bariloche Atomic Center)

Track Classification: Track 5 - Practical experiences in integrating safety and sustainable development