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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 was 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.

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