

NE-18-17638, Chemical Method Development for Quantifying Oxygen in Beryllium Salts

Kairos Power is a new nuclear energy technology and engineering company whose mission is to enable the world's transition to clean energy, with the ultimate goal to dramatically improve people's quality of life while protecting the environment. This goal will be accomplished through commercialization of the fluoride-salt-cooled, high-temperature reactor (FHR) that can be deployed with robust safety, affordable costs, and flexible operation to accommodate expansion of variable renewables. Kairos Power's FHR (KP-FHR) technology uses a novel combination of existing technologies to achieve unique levels of economy, safety, flexibility, modularity and security for nuclear power production.

KP-FHR design requires rigorous quantification of the reactor environment to characterize key compatibility interactions between the salt coolant and system materials (fuel, moderator, and structural materials). This project will develop an analytical method for characterizing trace to minor oxygen impurities in Flibe to enable a characterization of salt purity and relate it to materials reliability. Argonne National Laboratory and Oak Ridge National Laboratory will leverage their respective capabilities to accommodate Flibe purification and handling, generate standard mixtures of Flibe and oxygen containing compounds (i.e. oxides/hydroxides), and deploy in-house expertise in analytical method development.