



Contribution ID: 78

Type: ORAL

Mechanical Properties of Aluminium Alloys for Transport and Storage Cask after Long Term Storage

In recent dry transport and storage dual-purpose cask designs for spent nuclear fuel, various kinds of aluminium alloy are widely used for basket material as a structural member. Basket for dual-purpose cask is designed to maintain prescribed geometrical arrangements of spent fuel assemblies under accidents during transport and storage conditions, and also designed to have thermal performance for removal of decay heat from spent fuel assemblies. Aluminium alloys, which have a good heat-transfer performance and material workability as well as a high specific strength, are suitable for basket material.

Because cask may be transported to a reprocessing plant after long term storage at an interim storage plant, it is important to maintain integrities of basket structure under transport accidents after long term storage. However, mechanical properties of these alloys are possibly changed during storage since cask service temperature may affect micro structure of aluminium alloys over the long time period. It is therefore essential in cask design qualification to identify degradation in mechanical strength of basket material both conditions for normal storage and transport accident after long term storage.

MHI has been conducted comprehensive evaluation of mechanical properties considering thermal ageing of the aluminium alloys A6N01 containing boron carbide and normal A3004 without boron for the basket, which resulted in construction of a data base for assessing structural integrity of the basket. In this paper, effects of thermal ageing on mechanical properties of these materials are presented based on the data, and the microstructural strengthening mechanism which play important roles in the evolution of mechanical properties are discussed.

Country/ int. organization

Japan

Primary author: Mr ISHIKO, Daiichi (Mitsubishi Heavy Industries, LTD.)

Co-authors: Mr KISHIMOTO, Junichi (Mitsubishi Heavy Industries, LTD.); Mr YAMAMOTO, Ryuichi (Mitsubishi Heavy Industries, LTD.); Mr MAEGUCHI, Takaharu (Mitsubishi Heavy Industries, LTD.); Mr KAWAHARA, Yoshiyuki (Mitsubishi Heavy Industries, LTD.)

Presenter: Mr KISHIMOTO, Junichi (Mitsubishi Heavy Industries, LTD.)