

Investigation of Process Impurities during the Fabrication of Li₂TiO₃ Pebbles

Abstract

Lithium based ceramics are promising tritium breeding material for fusion reactor applications. Among the various lithium-based ceramic compounds, lithium titanate has been selected as the primary candidate material for Indian ceramic breeder concept. Lithium titanate is planned to be placed inside the fusion reactor in form of pebble bed with a diameter of ~ 1 mm. The Institute for Plasma Research has developed Li₂TiO₃ material by solid-state reaction process. The synthesized materials is converted to spherical pebbles using extrusion-spheronization and freeze granulation methods. Throughout the process, material undergo various mechanical operations such ball milling, high temperature annealing, and extrusion process etc. These mechanical operations have many advantages but also a few disadvantages also and one of which is the introduction of the process impurities. These process impurities may alter the appearance, chemical content and properties of Li₂TiO₃.

The objective of the project would be:

1. Identification of the impurities in the existing batches of Li₂TiO₃
2. Identification of the source of common process impurities.

Academic Qualification: Student pursuing BE/BTech in Chemical Engg or its associated streams shall apply.

Academic Project Requirements:

1) Required No. of student(s) for academic project: 1

2) Name of course with branch/discipline: B.E./B.Tech. Other

3) Academic Project duration:

(a) Total academic project duration: 15 Weeks

(b) Student's presence at IPR for academic project work: 2 Full working Days per week

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