

International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI)

Balapur P.O., Hyderabad – 500005, Telangana, India



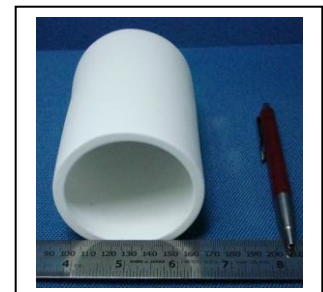
Sodium Beta Alumina (NBA) Ceramics for Energy applications

Overview

Sodium beta alumina has been late seen as one of the highly potential candidates for battery and other electrolyte based applications due to firstly its high levels of sodium ion conductivity and secondly for the availability and the low price of the raw materials required to prepare the desired composition. Easier to make at the lab level to demonstrate the technical features but its physical and chemical properties like sensitive to humidity, water, high sintering temperatures, sodium evaporation, low densities achieved, limited shelf life and limitations in scaling up of powder production etc., have made it difficult to get absorbed by the industry for real device applications. ARCI has taken up two projects to develop sintered shapes of Sodium beta alumina for two entirely different applications where the prime feature exploited would be its ionic conductivity. Production of kilograms of the powder reproducibly and maintaining its phase purity by inert storing has been established. Fabrication and successful firing overcoming the issue of sodium evaporation to obtain tube and container shapes is achieved. Field trials and number production is due and in progress.

Key Features

- Sodium beta alumina powder synthesis established in kgs level via solid state routes
- Sodium evaporation issues solved
- Desired densities (>94%) achieved at 1650-1700 Deg C
- Shaping issues resolved- tubes, containers prepared through casting /CIP techniques
- Storage in inert way safeguarding the phase purity is established
- Making of shapes in numbers is in progress



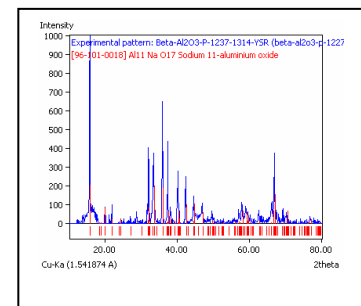
A typical one end tube of sintered Sodium beta alumina ready for testing

Potential Applications

- Sodium ion based ionic conductor- A good electrolyte
- High energy battery applications
- Selective separation techniques based on its ionic conductivity

Intellectual Property Development Indices (IPDI)

- Performance and stability are validated at laboratory scale
- Scale-up and prototype module fabrication underway



Phase purity as seen by XRD

Status	1	2	3	4	5	6	7	8	9	10
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