PROGRAMMA DI RICERCA STM

Il Fruitore:

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con qualifica…Professor…livello…Full……..

Descrizione dettagliata dell'Istituzione ospitante: .....
IENI – Istituto per l'Energetica e le Interfasi, Sede di Genova

Dipartimento di afferenza (tendina) DSCTM

Titolo del programma:

Development of efficient solid electrolyte materials for intermediate/low temperature solid oxide fuel cells

Relazione scientifica finale

During the visit, a few compositions of alkali metal doped strontium silicate ($Sr_{1-x}Na_xSiO_{3-0.5x}$; x=0.1, 0.2, 0.3, 0.4, 0.5; SNS) based electrolyte have been characterized. Samples were prepared in Prof. Singh's laboratory by solid state route and partially characterized by XRD.

The powders have been observed by SEM. They appeared composed by regularly shaped particles, with grain size in the range 0.3 – 3 μm.

Pellets sintered at 1000 °C have been electroded by application and curing at 700 °C of Ag paste on both sides.

The pellets were placed in a ceramic (alumina) test fixture equipped with four Pt wires, two Pt meshes, one thermocouple type S and an external mechanical load system, providing optimal conditions for electrochemical testing in air and at different temperatures.

Electrochemical Impedance spectroscopy was carried out by means of a FRA/potentiostat (IVIUMSTAT, Ivium Technologies, The Netherlands) controlled by dedicated software (IVIUMSOFT).

Spectra were recorded at constant temperature after equilibration, in the range 400 -650 °C. For samples with x=0.3 and x=0.4 an additional dwelling at 650 °C for 12 or 72 hours respectively was carried out.

Results show that conductivity increses with increasing Na concentration. Also it was found that conductivity decreases after dwelling at 650 °C and such an effect is dependent on time and possibly on Na concentration.

During the visit, Prof. Singh gave a seminar, which was announced on the ICMATE web site, entitled “Electroceramic materials for energy applications”. The seminar was also attended by PhD students from Materials Science and Technology course of Genova University.

A programme for future activities was also discussed, including exchange of visits and new investigation of the SNS system

Firma del Proponente

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