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**Development of new materials and demonstration of prototypes of polymer and
solid oxide fuel cells**
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The research activity carried out within the above-mentioned project refers to the preparation and characterization of materials for $\text{Ce}_{0.8}\text{Gd}_{0.2}\text{O}_{2-d}$ -based and $\text{La}_2\text{Mo}_2\text{O}_9$ -based solid oxide fuel cells.

The research activity on $\text{Ce}_{0.8}\text{Gd}_{0.2}\text{O}_{2-d}$ -based fuel cells mainly involved the synthesis, structural and electrochemical characterization of electrolyte and electrode materials. A significant part of the work was devoted to the optimization of pressing and sintering conditions for the preparation of large size (round shape 4 cm in diameter) anode Ni- $\text{Ce}_{0.8}\text{Gd}_{0.2}\text{O}_{2-d}$ cermet with adequate porosity, conductivity and mechanical stability.¹

With reference to the second class of materials, the research activity focused on the investigation of correlations between lattice effects and transport properties in K-doped $\text{La}_2\text{Mo}_2\text{O}_9$. High temperature neutron diffraction data, recorded in air and under vacuum, were used to follow the evolution with temperature of selected structural parameters, *i.e.* bond lengths and angles. Results suggested a possible correlation with the experimentally observed decrease of the activation energy for oxygen migration at high temperature observed for several member of this system. The effect on the structural properties of the low oxygen partial pressure used during the measurements in vacuum is negligible and this represents a valuable information in view of possible application of the material in solid state devices.²

References (including communications and abstracts)

1. S. Leonardi, F. Rossella, S. Schreier, **C. Tealdi**, G. Flor, U. Stimming "Preparation and characterization of ceria-based anode-supported MEAs for intermediate temperature SOFCs" II European Fuel Cell Technology and Applications Conference, dicembre 2007, Roma.
2. **C. Tealdi**, L. Malavasi, C. Ritter, G. Flor, G. Costa "Lattice effects in cubic $\text{La}_2\text{Mo}_2\text{O}_9$: Effect of vacuum and correlation with transport properties", J. Solid State Chem. 181 (2008) 603.