# CHARACTERIZATION OF CERAMIC MATERIALS FOR ELECTROCHEMICAL HYDROGEN SENSORS

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One of the main questions that the scientific community should overcome in the ITER project is the tritium generation. Lithium-lead eutectic is one of the candidates to be used for tritium generation and primary coolant in the blanket. It is important to note that lithium-lead eutectic can play the role of a shield, preventing escape of neutrons and γ radiation outside the blanket. Accurate and reliable tritium management is of basic importance for the correct operation conditions of the blanket tritium cycle. As a consequence, the determination of the hydrogen isotopes concentration in the liquid metal is of high interest for the blanket correct design.

The Electrochemical Methods Lab at Institut Quimic de Sarria (IQS) is working in the design and development of hydrogen sensors for molten lithium-lead eutectic. For reaching this goal, potentiometric hydrogen sensors based on solid state electrolytes, are under development. The main advantage of using this type of electrolytes is that they are selective for hydrogen ions.

The following compounds have been synthesized in order to be used as solid state electrolytes in the hydrogen sensors: $SrCe_{0,9}Y_{0,1}O_{3-\alpha}$, $Sr_3CaZr_{0,9}Ta_{1,1}O_{8,55}$, $SrCe_{0,95}Yb_{0,05}O_{3-\alpha}$, $CaZn_{0,9}In_{0,1}O_{3-\alpha}$, $Ba_3Y(Ca_{1,18}Nb_{1,82})O_{9-\alpha}$. The surface characteristics of the powder and sintered ceramics have been studied by SEM-EDS.

In addition, potentiometric measurements of the ceramic elements synthesized have been performed at different hydrogen concentrations. In these experiments, a fixed and known hydrogen pressure has been used in the reference electrode.

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