

Dipartimento di Scienze Chimiche - Mercoledì 14 aprile 2021, ore 15.00 - 16.30

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Università degli Studi di Padova - UNIPD
Dipartimento di Scienze Chimiche - DiSC

Antonella Glisenti

Building functionality while keeping sustainability: a short story of design in perovskites

Oxide based perovskites are compounds of the type ABO_3 in which A is a big 12-coordinated and B a small 6-coordinated cation. Perovskites are usually characterized by good stability at high temperatures and under severe conditions. Moreover these materials are (usually) easy to synthesize and up-scale; they are environmentally and economically sustainable and not dangerous for health. A challenge can thus be to start from a stable and cheap perovskite and build functionality. Starting from the role of the cations A and B some strategies to develop catalytic and electrocatalytic activity will be presented considering several fields relevant for a sustainable future: from abatement of pollutants, to the conversion of carbon dioxide into fuel, from Solid Oxide Cells to Sensors. Active cations can be introduced into the perovskitic cell or deposited on the surface giving rise to nanocomposites. Nanocomposites obtained by means of traditional (impregnation) and innovative (surface complexation, exsolution) procedures, will be investigated.

Il Direttore DiSC
Michele Maggini

Consiglio Nazionale delle Ricerche - CNR
Istituto di Chimica della Materia Condensata e di
Tecnologie per l'Energia - ICMATE

Simona Barison

Inorganic membranes for hydrogen separation

Hydrogen-based energy systems are an attractive strategy for a future replacement of the current fossil fuel-based systems. With its high energy density, H_2 is a valuable energy vector. At industrial scale, 95% of hydrogen is currently produced by steam reforming of natural gas, where an H_2 -rich gas mixture containing CO, CO_2 and other by-products is obtained. The membrane technology is nowadays increasingly considered as a candidate for substituting conventional purification systems, thanks to several advantages including low energy consumption, ability to carry out separation continuously, and simple scaling up. The main research field on this topic is the removal or reduction of Palladium content, by finding alternative alloys or by the reduction of selective layer thickness. This seminar aims at illustrating some examples of membranes based on porous alumina as substrate and Pd77Ag23 or multilayer Pd/V93Pd7/Pd coatings, deposited by High Power Impulse Magnetron Sputtering. Hydrogen fluxes, permeabilities and selectivities were investigated between 300 and 450°C besides the resistance to hydrogen embrittlement and to syngas in operating conditions.

Il Direttore DSCTM
Lidia Armelao

Il Direttore ICMATE
Vincenzo Buscaglia