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**UNIVERSITÀ DEGLI STUDI
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Poster Presentation 2

Smart Metal Organic Frameworks for Sensing Volatile Organic Compounds

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Traditional applications of metal-organic frameworks (MOFs) are focused on gas storage and separation, which take advantage of the inherent porosity and high surface area of these materials. The application of MOFs as chemical sensors requires signal transduction based on the dynamics of the analyte interacting with the MOF network. The main objective of our project is to design multifunctional (combination of optical and electrical signals) and dynamic Stimuli-Responsive Metal Organic Frameworks (*SR-MOFs*) with enhanced selectivity and sensitivity towards harmful volatile organic compounds (VOCs), to be integrated into sensory devices (Fig. 1). We honed from the design principles of previous research in the field of optical and/or conductive coordination polymers to select starting building blocks that can be employed to produce MOFs with remarkable optical/charge mobility and conductivity features. The selected units will offer extensive connectivity, flexibility, tunable porosity and functionalization of the inner surface of the network, with groups interacting with the analytes by means of coordination bonds, π - π interactions or hydrogen bonds. Harmful volatile compounds will entail gases and solvents (e.g., alcohols, benzene, hexane, cyclohexane). We envisage that the new sensors will show increased selectivity and sensitivity with respect to the state-of-the-art. Deposition of the new MOF materials on surfaces to create sensor devices will be accomplished by advanced deposition techniques. The designed devices will thus overtake the current bottleneck of processability that limits practical applications of these materials, filling the gap between basic research and marketable applications.

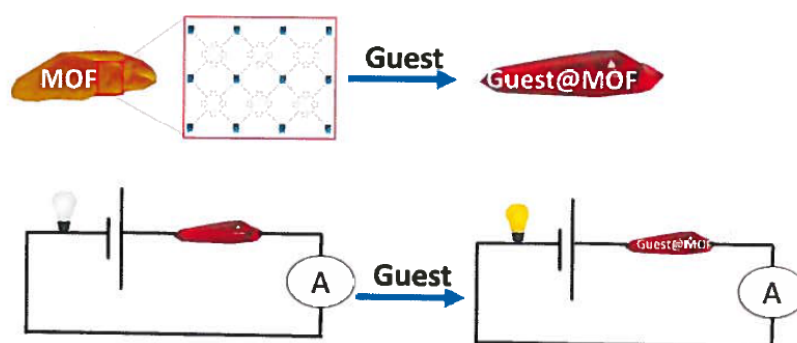


Fig. 1. Scheme of the proposed methodology.

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