

**Materials.it**  
**2018**



**Bologna - Area della Ricerca CNR - Centro congressi**  
**October 22 - 26, 2018**

Conference Chairs:

Corrado Spinella (Dipartimento di Scienze Fisiche e Tecnologie della Materia - CNR)

Maurizio Peruzzini (Dipartimento di Scienze Chimiche e Tecnologie dei Materiali - CNR)

**Italian National Conference on**  
**Materials Science and Technology**  
*Bologna, October 22 - 26, 2018*

Conference Chairs

Corrado Spinella (DSFTM - CNR)

Maurizio Peruzzini (DSCTM - CNR)

**BOOK OF ABSTRACT**



**SPRINGER NATURE**



**5Pascal**



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- Maurizio Peruzzini (CNR)

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# Plenary sessions

## Monday, October 22

- 12:00 -13:00 **Andreas Züttel** EPFL Lausanne (Switzerland)  
*Energy storage materials, hydrogen storage materials*
- 14:00 -15:00 **Avelino Corma** CSIC (Spain)  
*Attempts to synthesize zeolite catalysts for a preselected reaction*

## Tuesday, October 23

- 09:00 -10:00 **Nicolas Giuseppone** CNRS Strasbourg (France)  
*Stimuli-responsive materials for mechanical actuation*
- 16:30 -17:30 **Giovanni Baldi** CE.RI.COL Colorobbia Research Centre (Italy)  
*Hybrid magnetic-polymeric nanoparticles for nano medicine and immune therapy*

## Wednesday, October 24

- 09:00-10:00 **Gaetano Granozzi** Università di Padova (Italy)  
*3D Hybrid nanoarchitectures for sustainable energetics starting from 2d materials*
- 16:30 -17:30 **Salvo Coffa** STMICROELECTRONICS (Italy)  
*Materials for the electronic industry*

## Thursday, October 25

- 09:00-10:00 **Miriam Vitiello** CNR - NANO (Italy)  
*Title to be defined*
- 16:30 -17:30 **Luisa De Cola** Université de Strasbourg (France)  
*Self-assembled and breakable materials for medical applications*





Results showed that the ecoceramics maintained the same porous 3D structure of the cork; a characterisation of the materials was performed, as well as testing of some functional properties.

#### #060 - Placing of amino acids in microporous materials: a ZSM-5 and L zeolites Synchrotron x-ray characterization after l-lysine adsorption

Giada Beltrami - University of Ferrara

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Amino acids, which represent the proteins primary structural unit, belong to an important class of organic compounds exploited in several application fields, such as pharmaceutical, biomedical and food processing industries. The global market based on the amino acids production is constantly growing and cutting-edge sorbent materials for separation processes are continuously required to decrease amino acids losses during adsorption/desorption cycles. Zeolites and their adsorption properties represent an effective material in placing amino acids in form of well ordered-layers on the solid surface (Qiang et al, 2008). Based on this, two samples of l-lysine loaded ZSM-5 (SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> ratio (SAR) = 51 and 21, respectively) and one sample of L (SAR 6.1) were characterized through a multidisciplinary approach. Batch method (pH=5.5) was used to enable l-lysine sorption process, capillary electrophoresis separation technique was applied to obtain adsorption isotherms, while thermal analysis were used to quantify the total weight loss. Furthermore, Synchrotron X-ray powder diffraction (carried out at the MCX Beamline of Elettra Synchrotron, at Room Temperature and using a fix wavelength of 0.82700 Å) was performed to study ZSM-5 and L sorption capacity and structural modifications driven l-lysine adsorption. Rietveld structural refinements (processed through the GSAS-EXPGUI software package; Larson and von Dreele, 1994; Toby, 2001) were carried out in monoclinic (s.g. *P2<sub>1</sub>/n*) and hexagonal (s.g. *P6/mmm*) symmetry for ZSM-5 and L zeolite, respectively. Results obtained through difference Fourier map analysis highlighted that: in both ZSM-5 samples, l-lysine is located at the intersection of sinusoidal and straight channel and within the sinusoidal channel, while in L zeolite the molecule was detected within the monodimensional channel (*i.e.*, 6 possible orientations). Refined occupancies revealed an amount of extraframework species of about 4.85, 6.51 and 17.63 % for ZSM-5 SAR 51, ZSM-5 SAR 21 and L zeolite, respectively. The content quantified is in good agreement with adsorption isotherms data and thermal analysis results. After l-lysine adsorption, no noteworthy structural deformations were detected: channels retain their circular geometry. All the information gained revealed that ZSM-5 as well as L zeolites are efficient in l-lysine adsorption and this suggests a possible exploitation of both as sorbent materials in biocatalytic processes.

Larson, A.C. and von Dreele, R.B. (1994) Report LAUR, 86.

Qiang G., Wujung X., Yao X., Dong W., Yuhan S., Feng D. and Wanling S. (2008) Amino acid adsorption on mesoporous materials: influence of types of amino acids, modification of mesoporous materials, and solution conditions. *Journal of Physical Chemistry B*. 112, 2261-2267.

Toby B. H. (2001), EXPGUI a graphical user interface for GSAS, *Journal of Applied Crystallography*, 34, 210-213.