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Presenting author

Name Giorgio   Surname Celoria

Affiliation

- ☐ Senior
- ☑ PhD Student
- ☐ MS Student

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- ☑ Oral
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Please select at least one of the following topics

- ☐ Soft matter
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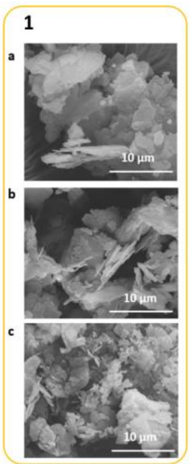
ID abstract. To be filled by Organizers

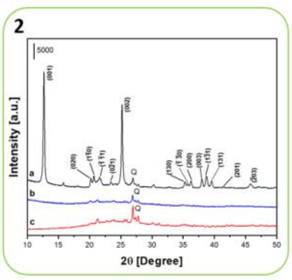
Silica particles derived from natural Kaolinite for the removal of organic dyes from polluted water

Giorgio Celoria [1], Vanessa Miglio [1], Geo Paul [1], Chiara Bisio [1,2], Giovanni Golemme [3], Enrico Boccaleri [4,5]

[1]Dipartimento di Scienze e Innovazione Tecnologica, Università del Piemonte Orientale A. Avogadro, viale T. Michel 11, 15121 Alessandria, Italy;
[2]CNR-SCITEC Istituto di Scienze e Tecnologie Chimiche "Giulio Natta", Via G. Venezian 21, 20133 Milano, Ita-ly;
[3]Dipartimento di Ingegneria Ambientale, Università della Calabria, Via P. Bucci 45A, 87036 Rende, Italy;
[4]UPO4Sustainability Center, Viale T. Michel 11, 15121 Alessandria, Italy;
[5]Dipartimento per lo Sviluppo Sostenibile e la Transizione Ecologica, Università del Piemonte Orientale A. Avogadro, piazza S. Eusebio 5, 13100 Vercelli, Italy;
Presenter's e-mail address: giorgio.celoria@uniupo.it

In the last decades, the quality of waterbodies suffered a sharp decline due to anthropogenic activities [1]. In particular, toxic dyes deserve growing attention due to their harmful effect on the ecosystem and human health [2]. To limit the continuous spreading of noxious species in the surrounding waterbodies, several methods can be employed [3]. In this respect, adsorption deserve particular attention due to its low costs, versatility and performances [4]. Among the most used sorbents, (*i.e*. silicas, zeolite and activated carbons [1,4]) natural clays are often used for the treatment of wastewaters thanks to their low cost, environmental sustainability and high natural abundance [5]. In this respect, this work deals with the thermal and chemical modification of a natural kaolinite that was calcined at 700 °C and treated with HCl to remove aluminum thus obtaining a siliceous material. The structural changes and the physico-chemical properties of the materials at different stages of thermal and chemical modification were investigated with several techniques including XRPD, MAS-NMR, SEM-EDX, FT-IR and N_2 physisorption at 77 K. The ability of parent kaolinite and siliceous material to capture the organic dye Rhodamine B from aqueous phase was investigated by means of UV-Vis spectroscopy. The siliceous material exhibited better adsorption capacity with respect to the parent kaolinite. Finally, the functional stability of the siliceous material was tested over three cycles of regeneration and adsorption.





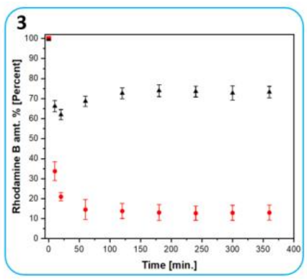


Figure 1. SEM micrographs of kaolinite (a), metakaolin (b) and silica particles (c);
Figure 2. XRD diffraction pattern of kaolinite (a) metakaolin (b) and silica particles (c);
Figure 3. Residual amount of Rhodamine B (initial concentration 2·10-2 mM) vs. time in water suspensions of kaolinite (black triangle) and silica particles (red circles). Initial amount (squares) is 100%. Error bars are the standard deviation over three measurements.

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