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## 3D STRUCTURED COMPOSITE FILTER MATERIALS WITH EMBEDDED NATURAL NANO-FILLERS

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**D**evelopment of bio-based filtering materials follows the need for a drastic reduction in solid particle-pollution, which is nowadays one of the largest risks for human health and state of the environment. Filtering sector currently concerns itself primarily with removal and immobilization of increasingly small particles, effectively requiring small pore size and enhanced surface area. This research work is a part of a national research and development program "Cel.Cycle", aiming at constructing materials with a hierarchical porous structure and increased active surface; in order to do this, existing and novel technologies will be employed, as well as integration of active components (inorganic particles; micro- and nano-fibrillated cellulose), leading to 3D nonwoven structures with desired functional properties. The increase of organic compounds in environment encourages also search for more efficient adsorbents used in water treatment. Clays are known as natural environmental-friendly materials with high specific surface area, used in dispersed form, for the adsorption and removal of organic pollutants, causing difficult removal from purified water. Therefore, the second part of this research is focused on preparation and characterization methods

of nanocomposite clay/polymer hydrogels used for adsorption of textile dyes. Structures and functionalities of nanocomposites will be described and conditions (e.g. clay particle type and concentration, dispersing medium, monomer, cross-linker concentrations, and drying procedure, etc.) for achieving exfoliated and intercalated clay-hydrogel structures will be discussed. In addition to functional properties of nanocomposites conditioned by the nanocomposite, their preparation process will be discussed.

### Biography

Manja Kurečič is a Scientific Associate at the Faculty of Mechanical Engineering, University of Maribor and Technical University Graz, Austria, where she is working on several national and international basic and applied projects. She has a background on nanocomposite hydrogels for water purification, which she upgraded with new technologies for preparation of different nanostructured materials that can find applications in technical as well as in the biomedical area. Lately, she is focusing on development of innovative nanofibrous materials by using electrospinning method.

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