Project: H2O PURE

EU4TECH No: # 42

Project name (Acronym and full)	H_2O PURE Nano-geopolymer based remediation techniques for groundwater purification (Concept of Sustainable material and residual Waste minimization)
Project team leader	Dr Nenad Grba
Applying organization (enterprise or PRO):	PRO University of Novi Sad Faculty of Sciences, Department of Chemistry, Biochemistry and Environmental Protection
WB6	Serbia
Technology Field	Water treatment technologies
Target Market adoptions sector(s)	Drinking water and waste/process water treatment industries

Project abstract

Many techniques have been developed for the removal of hazardous heavy metals from contaminated landsides, but nowadays low-cost and efficient sorbents like clay or activated carbon are being considered. Geopolymers are a novel type of amorphous aluminosilicate materials with unique three-dimensional network structure. Their unique properties (high surface area and charged surface) make them promising sorbents for hazardous heavy metals. The solution is applicable generally in the Pannonian region, (Serbia, Hungary, Bosnia and Herzegovina, Croatia and others), with higher Mn content and particular in industry, mostly food industry and public water supply systems.

The main objective of the project is to develop and implement an innovative eco-friendly and cost-effective water remediation technology at laboratory-, pilot- and potentially full-scale, based on novel and tailored nano-geopolymers without irradiation of biota. A groundwater rich in manganese concentration (from 50 to 900 µg/l) will be remediated using a newly developed groundwater purification process and a flow-through column system loaded with green, low-cost geopolymers. The removal efficiency, binding capacity and leachability of heavy metals from groundwater (dominantly manganese) will be assessed by state-of-the-art mineralogical, thermo-analytical and spectroscopic methods and mass spectrometry, in line with local and EU guidelines. The proposed solution will be both product (novel flow-through column system with polymer) and service (maintenance of system). The novel technology will be tested on drinking water and industry waste/process water. In addition to small and large industry systems in food process, paper, dyer and other industries, this system could be also adapted to small water utilities supplying villages and towns of less than 25,000 people.

Activities that will be supported by EU4TECH for this PoC project are the exploration of potential markets and routes to market as well as identification of early adopters and industrial partners. A suitable intellectual property strategy will be proposed and the possibility for a patent application will be analysed. Potential national and international funding sources will be identified.