

Active substrate (AS) used to prevent the migration of heavy metals to the soil and water environment according to the Polish patent application P. 442582 (2022)

Authors: Katarzyna Witt, Daria Bożejewicz, Waldemar Studziński, Karolina Lelewer, Katarzyna Belka

Affiliation: Faculty of Chemical Technology and Engineering, Bydgoszcz University of Science and Technology, 3 Seminaryjna Street, PL 85326 Bydgoszcz, Poland

Contact: [Katarzyna.Witt@pbs.edu.pl](mailto:Katarzyna.Witt@pbs.edu.pl)

The subject of the invention is an innovative active substrate used to prevent contamination of the water and ground environment with heavy metals. Presented solution effectively reduces the concentration of heavy metals in water and the water-soil, and soil environment. It was found that in an aqueous solution, the active substrate reduced the concentration of nickel, cadmium, and lead by more than half, and chromium even above 90%. High effectiveness in limiting the migration of metals from soil to water was also noted, especially for chromium and zinc (reduction of over 81% and 66%, respectively). In the soil environment, the active substrate with the addition of a plasticizer showed the greatest effectiveness. This solution reduced each metal ion tested by at least 50%, and cadmium, lead, and copper by more than 70%. The results indicate that the active substrate used can be used selectively as well as for the sorption of a wider range of heavy metals. In addition to the demonstrated effectiveness in reducing the concentration of metals in environmental matrices, the production of active substrates is economical and can be regenerated and reused. The indicated advantages mean that the active substrate can be an alternative to the solutions currently available on the market, e.g. permeable reactive barriers.