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## Hazardous industrial wastes treatment for production of environment friendly materials



**Vsevolod Mymrin**

Federal University of Technology-  
Paraná, Brazil

Co-authors: Kirill Alekseev, Monica A Avanci,  
Alfredolarozinski N and Catai R E  
Federal University of Technology- Paraná, Brazil

This paper reports on recycling mixed industrial wastes (exhaust metallurgical dust, spent foundry sands, galvanic glass microspheres waste, and acid inertization salt) into environmentally friendly composite ceramic materials. The only natural component of the developed compositions was clay and sand mixture, which is a traditional raw material of local brick factories. All industrial wastes under study had high contents of heavy metals, such as Pb, Br, Sr and Cr. The main goal of this research was development of eco-friendly construction materials based on these hazardous industrial wastes to reduce wastes disposal at dumps that chemically contaminate the environment. This would prolong service life of industrial landfills and essentially reduce exploitation of natural raw materials. Samples containing 75-85% of industrial wastes fabricated at 950-1,010°C had flexural strength values of up to 14 MPa. Physicochemical processes of the ceramics structure formation, studied by the complex of XRD, DTA, TG, SEM, EDS, mapping and LAMMA analyses, proved that during calcination of the initial mixtures disappeared some minerals - Magnetite  $\text{Fe}_3\text{O}_4$ , Illite  $\text{KAl}_2(\text{Si}_3\text{Al})\text{O}_{10}(\text{OH})_2$  and Halite  $\text{NaCl}$ ; remained were unchanged Quartz  $\text{SiO}_2$ , Cristobalite  $\text{SiO}_2$ , Thenardite  $\text{Na}_2\text{SO}_4$  and Hematite  $\text{Fe}_2\text{O}_3$ ; newly formed were only two minerals - Andesine  $(\text{Na,Ca})\text{Al}(\text{Si,Al})_3\text{O}_8$ , and Diopside  $\text{CaMg}(\text{Si}_2\text{O}_6)$ . The values of leaching and solubility of the heavy metals, studied by AAS method, demonstrate their hundreds of times less numbers than those permitted by the national standards of Brazil. They were strongly neutralized by predominated quantity of glassy amorphous new formations.

### Biography

Vsevolod Mymrin has completed his PhD and DSc from Moscow State University (MGU) of Geological and Environmental Engineering. He is a Full Professor of Civil Engineering Dept., Federal University of Technology, Paraná, Curitiba, Brazil. He was a Member of Nobel Prize team winner for discovery of laser beams (1964), has published more than 100 papers in reputed Russian and international journals and near 50 patents in the field of industrial and municipal wastes utilization as valuable raw materials with very high economical and environment efficiency.

seva6219@gmail.com

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