

Laboratory of Advanced Ceramics



Current research works

- Synthesis and application of **environment-friendly** organic substances for advanced ceramics shaping by means of following methods:
 - gelcasting
 - direct coagulation casting
 - tape casting
 - die pressing
- Synthesis and application of saccharides and their derivatives in **colloidal processing** of ceramic **nanopowders** (Al_2O_3 , ZrO_2 , TiO_2 , Y_2O_3 , ZnO , etc.)
- Design of ceramic-ceramic, ceramic-metal and special ceramic-polymer composites for dental application
- Design of ceramic-polymer composites with **bone-structured** ceramic preform for cell immobilization
- Design and application of ceramic and ceramic-polymer filters for separation of oils and **viruses** from water
- Fabrication of ceramic **microreactors**
- Archeometry

Selected publications

- P. Bednarek, M. Szafran, Y. Sakka, T. Mizerski, Gelcasting of alumina with a new monomer synthesized from glucose, *J. Eur. Ceram. Soc.*, 30 (2010) 1795-1801.
- P. Falkowski, P. Bednarek, A. Danelska, T. Mizerski, M. Szafran, Application of monosaccharides derivatives in colloidal processing, *J. Eur. Ceram. Soc.*, 30 (2010) 2805-2811.
- M. Szafran, A. Szudarska, P. Bednarek, *New Low-toxic Water-Soluble Monomers for Gelcasting of Ceramic Powders*, *Adv. Sci. Techn.*, 62 (2010) 163-168.
- A. Danelska, M. Szafran, E. Bobryk, *D-Fructose in Deflocculation proces of nano-ZrO₂ Powders*, *Arch. Metal. Mat.*, 54 (2009) 1029-1034.
- M. Szafran, K. Konopka, E. Bobryk, K. J. Kurzydłowski, *Ceramic matrix composites with gradient concentration of metal particles*, *J. Eur. Ceram. Soc.*, 27 (2007) 651-654.
- C. Tallon, D. Jach, R. Moreno, M. I. Nieto, G. Rokicki, M. Szafran, *Gelcasting Performance of Alumina Aqueous Suspensions with Glycerol Monoacrylate: A New Low-Toxicity Acrylic Monomer*, *J. Am. Ceram. Soc.*, 90[5] (2007) 1386-1393.
- M. Szafran, K. Jach, A. Tomaszewska-Grzęda, R. Rokicki, *Utilisation of Enzymatic Reactions in Al₂O₃ Powder Moulding Process*, *J. Therm. Anal. Cal.*, 74 (2003) 639-646.

Head:

Mikołaj Szafran

Staff:

Paulina Bednarek
Ewa Bobryk
Paweł Falkowski
Ewa Gałąj
Marta Łukaszuk

PhD students:

Anna Danelska
Magdalena Gizowska
Agnieszka Szudarska
Milena Zalewska

Research profile

Design of advanced ceramics on the basis of chemistry

Development of advanced ceramics moulding methods:

gelcasting
direct coagulation casting
tape casting

Nanoceramics synthesis and processing
Ceramic matrix composites
Dental composites
Porous ceramics (e.g. for water treatment)
Archeometry