











4th POLISH-SLOVAK-CHINESE SEMINAR on CERAMICS

**determining
the content and distribution of Nd in YAG
using laser ablation**

H. Kaňková, L. Buňová, J. Gombárová, D. Galusck, D. Galusková





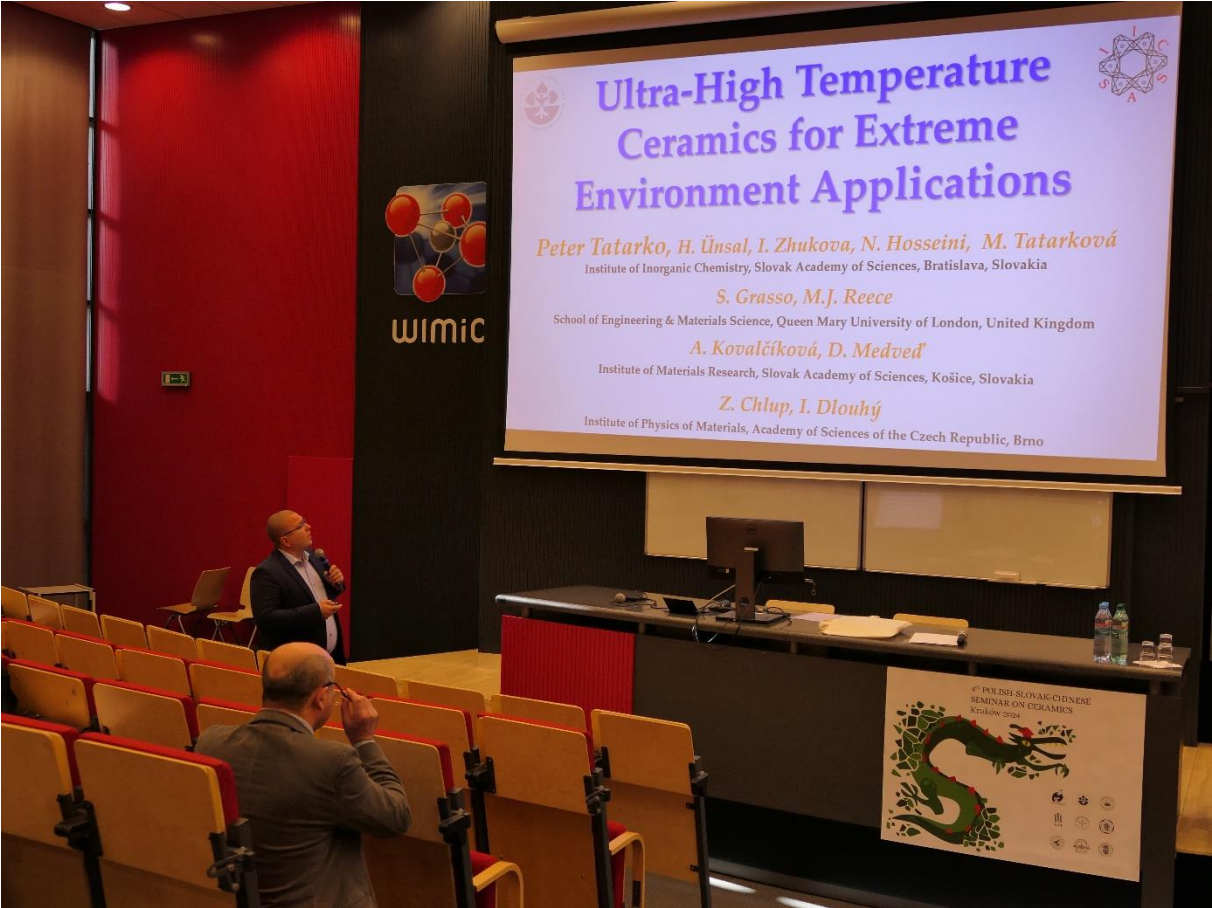


















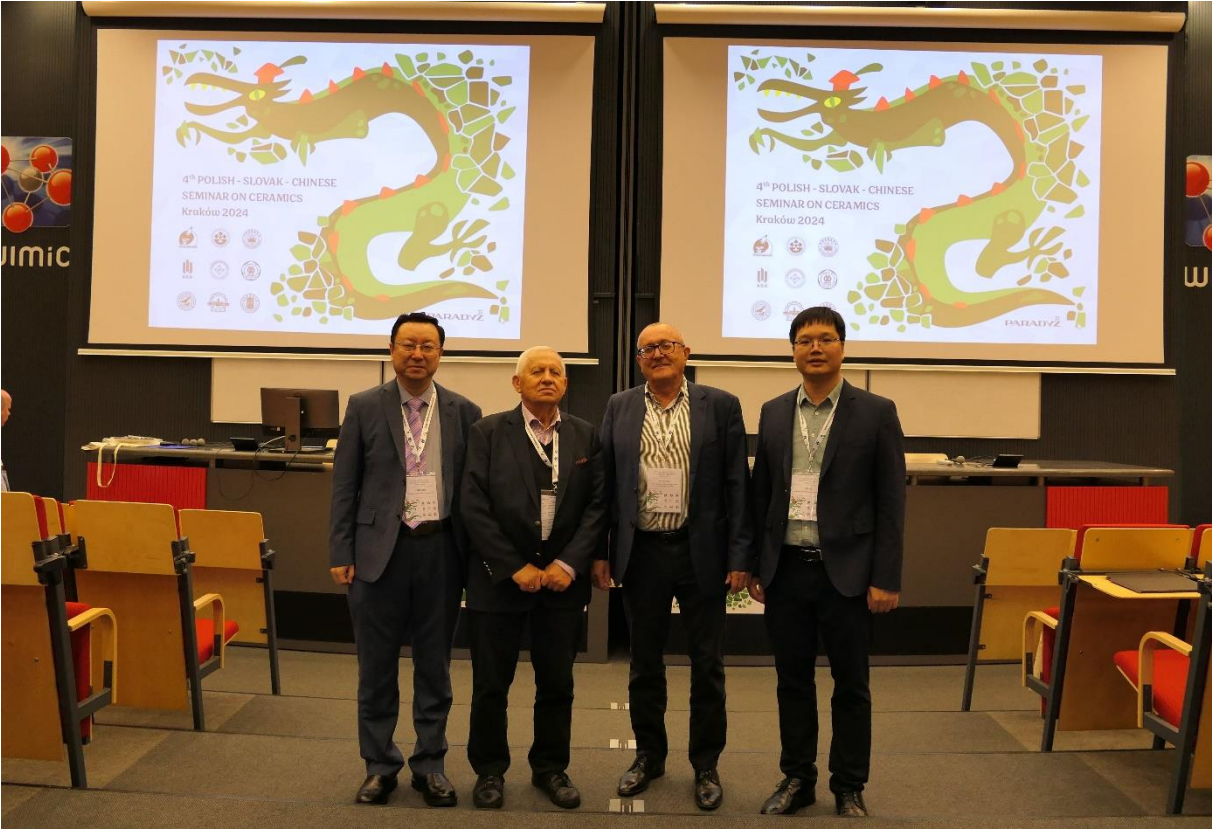


















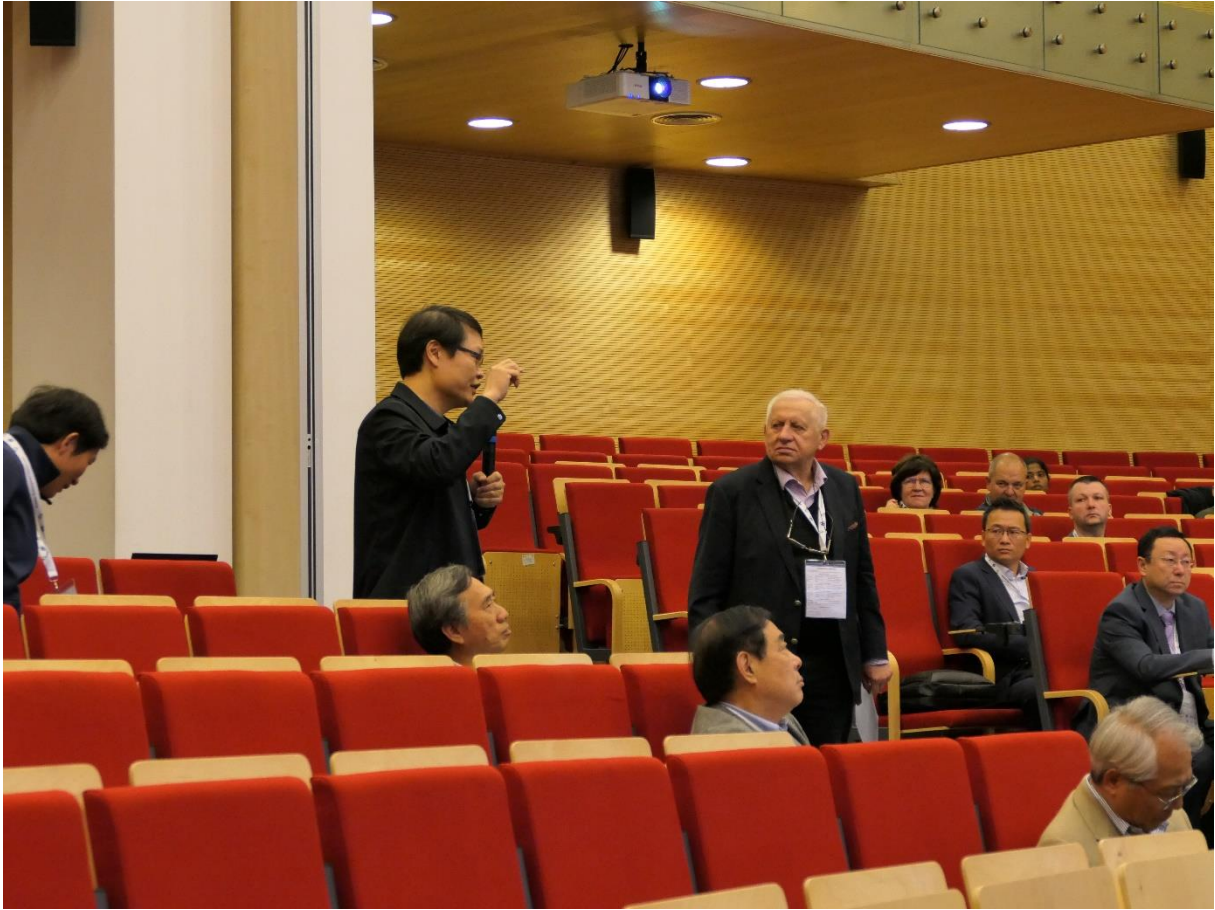










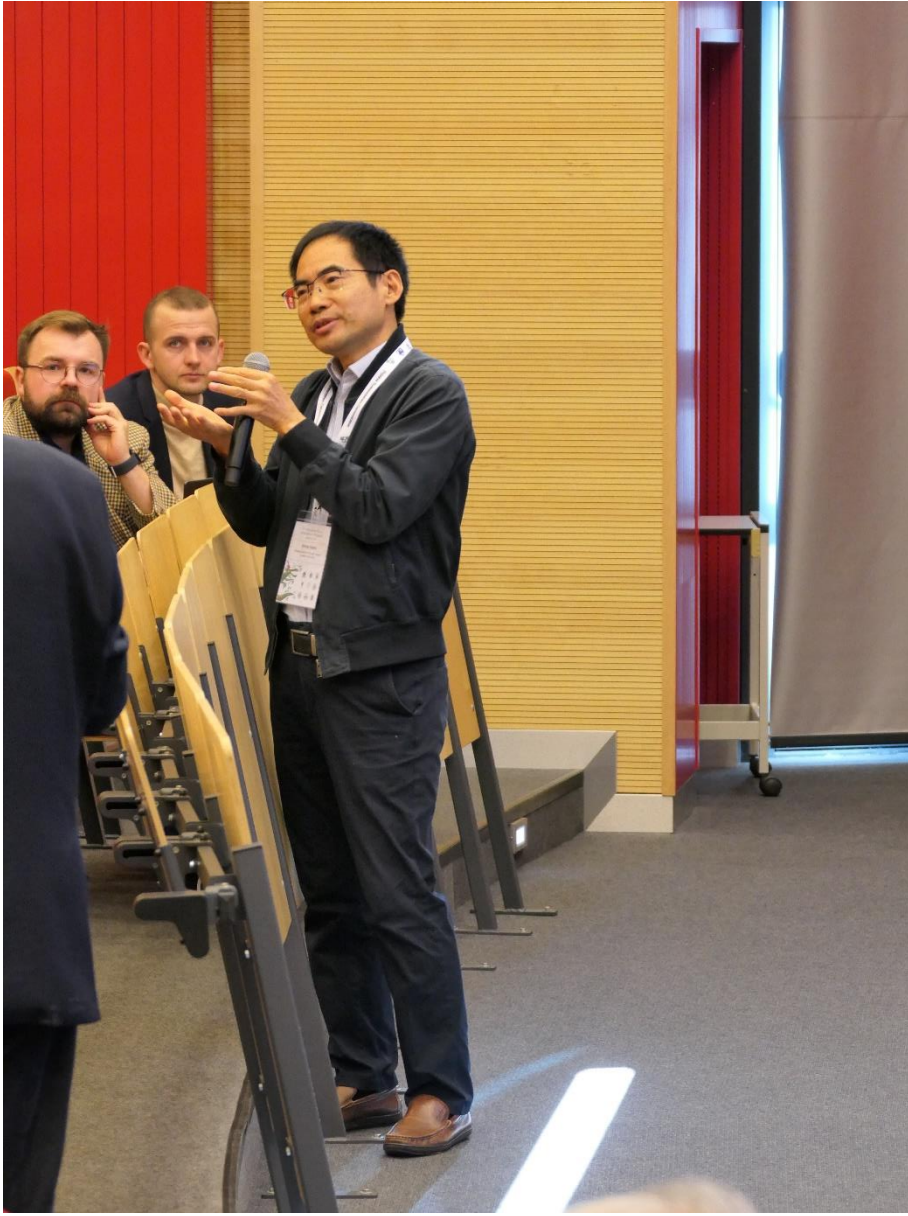






































Polish-Slovakian-Czech Seminar on Ceramics, Sept.27-Oct.2, 2024, Krakow, Poland

Electric field-controlled magnetism in R-substituted BiFeO₃ multiferroic ceramics

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Supported by 71570 & 78057

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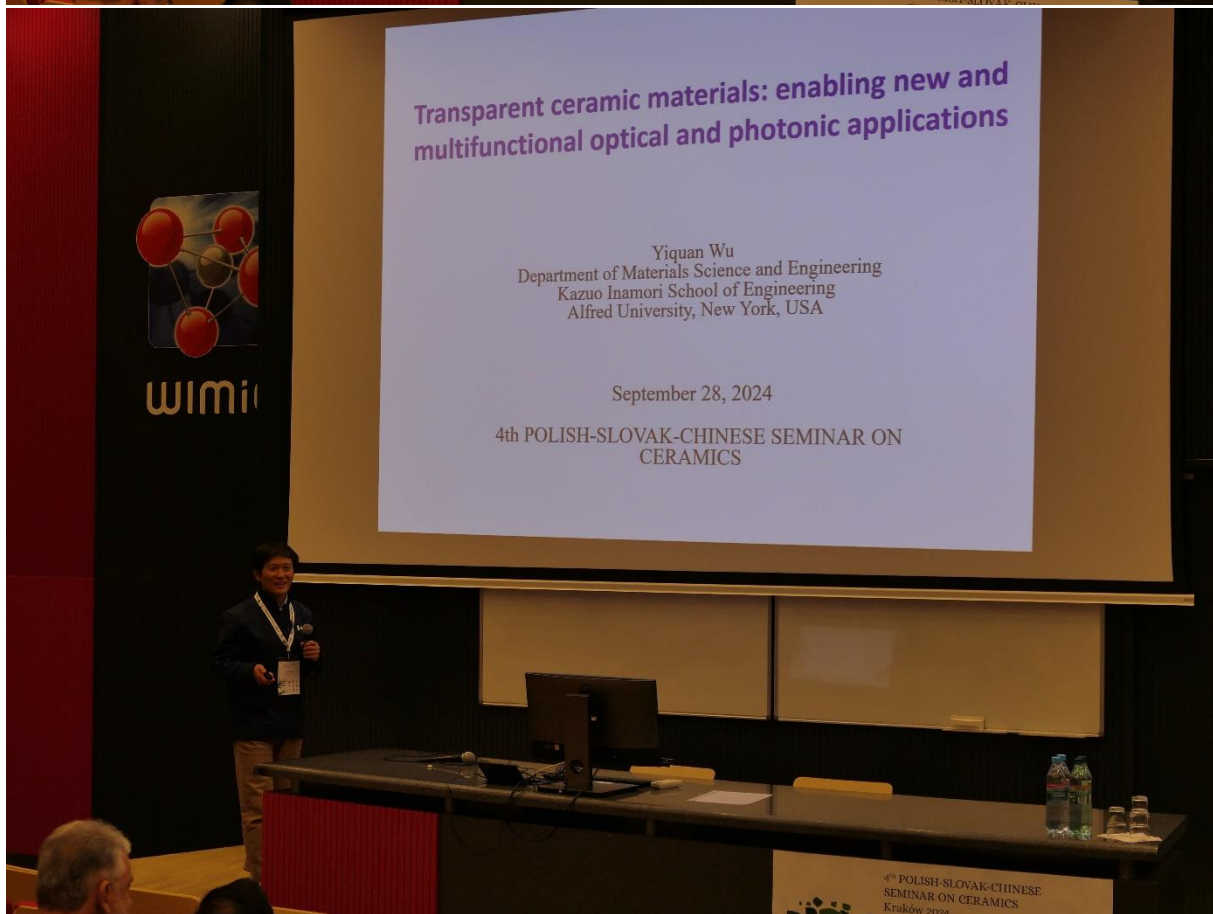
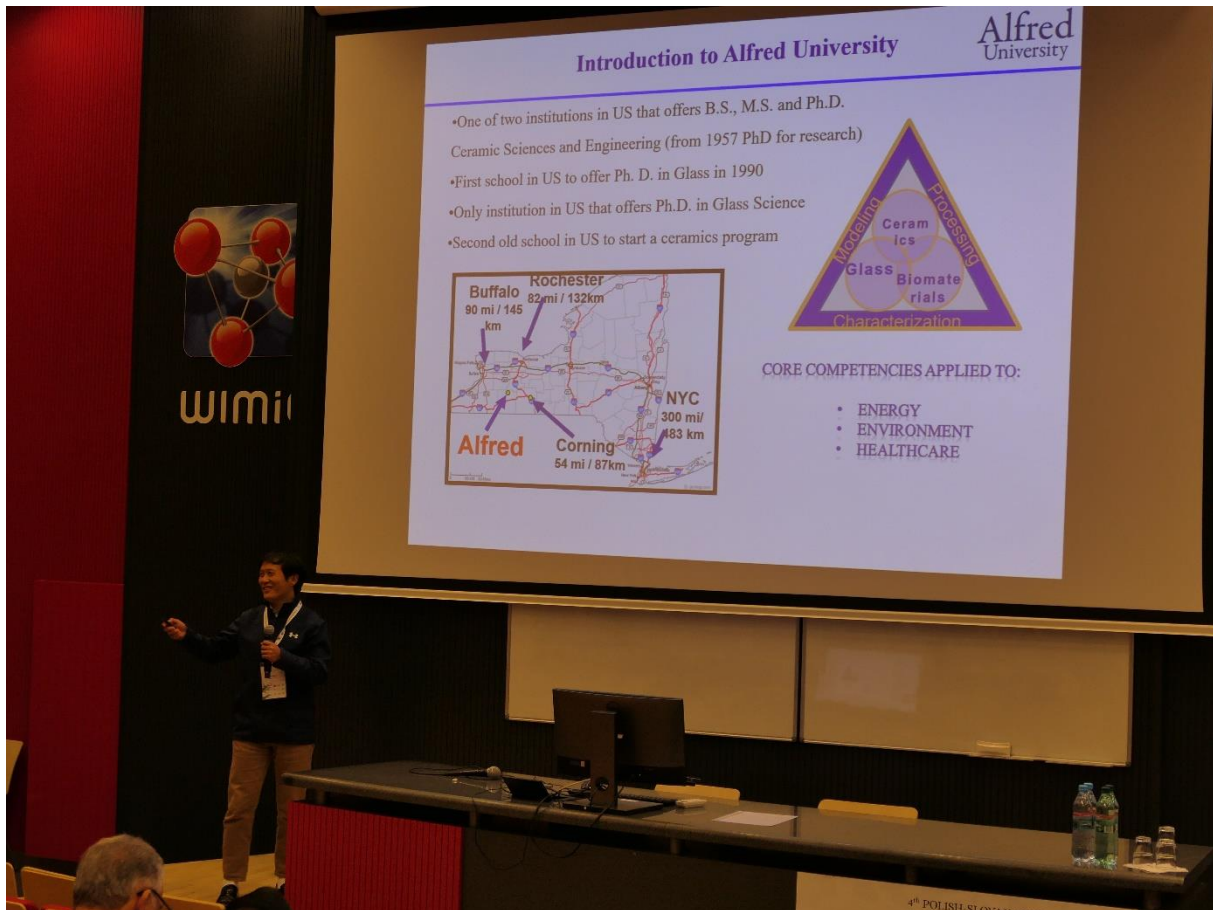
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- ### Conclusions
- Colloidal processing is a very important tool to design the properties of advanced ceramic materials; eg. CMC, ceramic-metal composites, ceramic-polymer composites.
 - Designing and synthesis of organic additives allows to understand the mechanisms of interactions between ceramic particles and the additives.
 - There is no universal polymeric additives for a ceramic powder molding method. For particular kind of ceramic powder and shaping method individual organic additives should be prepared.
 - Heterocoagulation process allows to design the structure of the composites by changing the charge between ceramic and metal particles. If the charges on the ceramic and metal is ceramic matrix, if they have opposite charge, it is possible to obtain ceramic-metal composites with homogeneous structure.
 - Al₂O₃, Ni and Al₂O₃, Mn composites have been obtained by DLP 3D printing process.
 - Metallic grains strongly hinder the photopolymerization process, however, even the small shape of the metallic phase (0.5 wt%) causes the increase in fracture toughness.
 - Replacing metallic powders with metallic precursors allows to obtain composites with nanometer size of metallic particles and their good distribution in the ceramic matrix.

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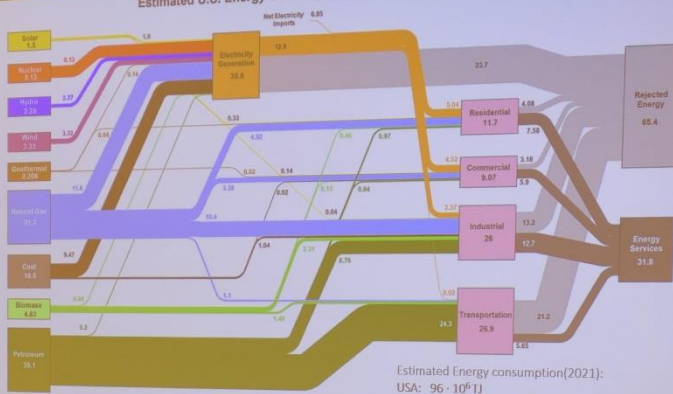




Motivation: waste-heat recovery

Estimated U.S. Energy Consumption in 2021: 97.3 Quads

Lawrence Livermore National Laboratory



Estimated Energy consumption(2021):
USA: $96 \cdot 10^6$ TJ
Poland: $4.4 \cdot 10^6$ TJ – waste heat amount: $2.9 \cdot 10^6$ TJ

Slide 2







