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**ADVANCED MATERIALS  
AND  
TECHNOLOGIES**

*27-31 August 2012, Palanga, Lithuania*

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# **ADVANCED MATERIALS AND TECHNOLOGIES**

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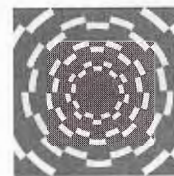
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## P74. Influence of Metal Oxides on Porosity of Mullite Ceramics

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Porous ceramics have many applications in different fields of science and engineering. There is a large number of ways to produce porous ceramics. The most important of them are replication, direct foaming and sacrificial templating. In our work we use direct foaming by hydrogen gas formation in a chemical reaction between aluminium paste and water at correspond  $\text{pH} > 7$  of raw materials suspension. For that matter, this allows to use the slip casting of raw materials slurry and it is more ecological than the two others methods, because it doesn't have same combustible objects as synthetic or natural template. As the result direct foaming method both open and closed porosity are attainable. pore shapes are generally spherical or ellipsoidal. By altering the slurry chemistry and gas feed-rate, one can control the pore size, pore size distribution and total porosity [1, 2].

Different metal oxides influence on the ceramics properties. Such metal oxides as  $\text{MgO}$  and  $\text{WO}_3$  have positive effect on the thermal stability of mullite ceramics [3]. Therefore, the aim of this work is investigate the influence of these oxides on viscosity of slurry, porosity and pore form of ceramic. Different commercially available  $\text{Al}_2\text{O}_3$  (*Nabalox, Germany*):  $\alpha\text{-Al}_2\text{O}_3$  ( $d_{50}=4 \mu\text{m}$ ) and  $\gamma\text{-Al}_2\text{O}_3$  ( $d_{50}=80 \mu\text{m}$ ), kaolin (*MEKA, Germany*) (with  $\text{SiO}_2$  -56.2 wt%,  $\text{Al}_2\text{O}_3$ -31.0 wt%,  $\text{Fe}_2\text{O}_3$ -0.29 wt%, kaolinite 72 wt%, quartz 21 wt%, illite 7 wt%), pure  $\text{SiO}_2$  ( $d_{50}=6.94 \mu\text{m}$ ), powders of  $\text{MgO}$  and  $\text{WO}_3$  with  $d_{50} \approx 2 \mu\text{m}$  were used as the starting materials. Aluminium paste (*Aquapor 9008*) was used as the pore forming agent. Distilled water was needed for creation of raw materials suspension.

**Keywords:** mullite porous ceramic, magnesium oxide, tungsten oxide, kaolin

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