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YOUNG SCIENTISTS in CERAMICS**

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**POSSIBILITY TO USE SPENT FLUID CATALYTIC CRACKING
CATALYST AS COMPONENT OF PORTLAND CEMENT BINDERS**

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Fluid cracking catalyst residue (spent FCC) is a by-product from petrol refineries. It primarily consists of zeolite (in used sample - faujasite) and amorphous aluminosilicates. In this study, possibility to use spent FCC as a component of binders with low content of Portland cement (PC) have been investigated.

Binders made with high volume of mineral additions are being developed in order to reduce the amount CO₂ emitted by PC industry. Fly ash (FA), a by-product of coal combustion in thermal power plants, is one of the most commonly used raw material for these binders. The main shortages of binders with high volume of FA are long setting time and low early strength.

In this work, mixtures of PC, FA and spent FCC were prepared. It was found that addition of spent FCC to low PC mixtures significantly shortened setting time and improved early strength of the binders. However, 28-day compressive strength of the ternary binder was lower than the strength of low PC binder synthesized with FA only, which indicated the need for further optimization of the binder composition.

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**EFFECT OF TITANIUM OXIDE ADDITION INTO MAGNESIA
REFRACTORIES**

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This work contains the results of investigations into the influence of titanium oxide (TiO₂) addition on the properties of refractory magnesia ceramics. The presented research involved adding titanium oxide in a classic way, i.e. directly to the ceramic mix. The conducted laboratory tests revealed a significant impact of this oxide on the functional properties of refractory materials. Addition of a small amount of TiO₂ favoured the ceramic mix sintering whereas adding a bigger amount - more than 10 wt.% resulted in the formation of materials characterised by considerable porosity and low