

THE USE OF FLY ASH FOR THE SYNTHESIS OF INSULATING MATERIALS

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INTRODUCTION

Power generation in Poland is mainly based on coal and lignite as fuels. Consequently the power generation sector has become a major source of waste production. Extensive efforts are made to reuse fly ash as much as possible. The research is a new proposal for waste management of fly ash from the energetical sector in Poland. The main target in this study was to obtain insulating material based on fly ash with a perlite addition. The refractory of the obtained material and its thermal conduction coefficient were examined.

EXPERIMENTS / FUNDAMENTAL OF THE PROBLEM / EXAMINATIONS

The main target of this research was to obtain a material with good thermal insulation properties. As regards to the research part, certain amounts of fly ash, perlite, sodium water glass and NaOH were used to synthesis the material. All the ingredients were mixed into a smooth, homogeneous mass using a magnetic stirrer. The obtained mixture was transferred to a form, which was made in accordance with PN-EN 196-1 (Picture 1) and heated for 24 hours at 60°C. Then the sample was seasoned for 60 days. After this time, the insulating and refractory properties of the obtained material were examined. The study included examining its thermal conduction coefficient and refractory.



Picture 1: Form for synthesis

RESULTS AND DISCUSSION

The insulation and refractory properties of the obtained material were tested. The synthesized material is characterized by thermal conduction coefficient of 0,107 W/(m·K), which is a good result compared to commercially used materials. The examination of refractory, which is 115 sP means that the material is fireproof up to 1150°C. Analysing literature, materials are classified as fireproof if they do not deform up to 1580°C [2].



Picture 2: Obtained material

Thermal conduction coefficient	Refractory
0,107 W/(m·K)	115 sP

Table 1: Results of the study: value of thermal conduction coefficient and refractory

CONCLUSION

The research has shown that the obtained material is characterized by good thermal insulation properties and slightly worse refractory properties. In the future compressive strength examination should be carried out. However literature reports that geopolymers synthesized from fly ash have a high compressive strength value [1]. With such a low thermal conduction coefficient and probable high compressive strength, the obtained material may be an alternative insulation and construction material for commonly used products.

REFERENCES

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