

EFFECT OF PROCESS PARAMETERS ON STRENGTH AND CARBONATION OF ENGINEERED BUILDING MATERIALS BY CALCIUM RICH ALKALI WASTES

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In this study, the effect of temperature and curing pressure in humidity-controlled conditions on strength development and carbonation depth of carbonized Oil shale ash (OSA) and wood ash (WA) compacts were investigated. The formation of carbonate phases leads to development of compressive strength[1]. Carbonation experiments were performed in automated carbonation unit (stainless-steel chamber) consisting of temperature and gas controlling and monitoring apparatus. Compressive strength results and the extent of carbonation which is measured by thermogravimetric analysis (TGA) with immediate calcination afterwards, are used as main parameter to evaluate the performance of the carbonated compacts. In general, carbonation reaction happens at two different rates being fast at the beginning and slowing down in the rest of the carbonation process. Effect of higher curing pressure is more visible in the second stage of the reaction (see Fig.

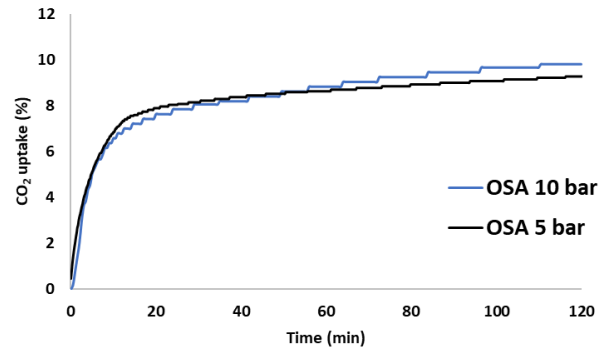


Fig.1 Gas consumption curves of FA compacts cured at 5 bar and 10 bar compacts.

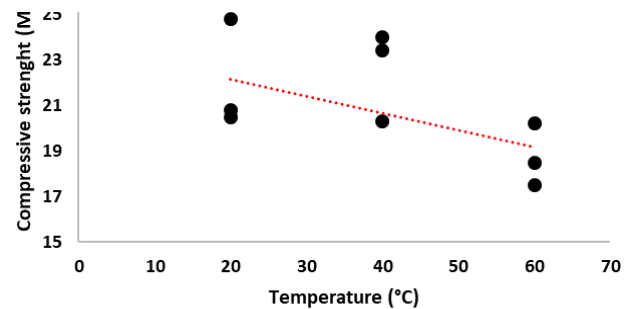


Fig.2 Strength development vs temperature of compacts cured at 10 bar.

1). There was a downward linear relation between temperature and compressive strength of compacts (see Fig. 2).

References

1. Usta, M. C., Yörük, C. R., Hain, T., Paaver, P., Snellings, R., Rozov, E., ... Uibu, M. (2020). Evaluation of New Applications of Oil Shale Ashes in Building Materials. *Minerals*, 10(9), 765. doi:10.3390/min10090765



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