

PORE DISTRIBUTION AND WATER UPTAKE IN A CENOSPHERE-CEMENT PASTE COMPOSITE MATERIAL

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The application of alumina silicate cenospheres (CS) is one of the discussed topics nowadays. As a significant waste material from power plants using coal, CS should be utilized in other industries to avoid the pollution of nature with ashes. The use of CS as Portland cement replacement material can control physical and mechanical properties and make a product lighter and cost-effective. In the frame of this study Portland cement paste samples were produced by adding CS in the range of concentration from 0 to 40 volume %. The water uptake of hardened samples was checked and pore size distribution by using the mercury porosimetry was determined. In cold climate where the temperature is often below 0 °C, it is important to avoid the amount of micrometer sized pores in the final structure and to decrease water absorption capacity of the material. In winter conditions water is filling such pores and causing additional stress to their walls when expanding while freezing. It was found that generally water uptake capacity for cement paste samples decreased up to 20 % by increasing the concentration of CS up to 40 volume %, at the same time the volume of micrometer sized opened pores increases.

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