Effect of high temperature on the behavior of basalt textile reinforced refractory concrete under uniaxial tensile loading

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Abstract

The work in hand presents the preliminary results of an experimental investigation on the thermo-mechanical properties of a textile refractory composite reinforced with basalt fibers under tensile loading. The composites were produced as a laminate material using five basalt bi-directional fabric layers as reinforcement. A high alumina cement matrix was used in the matrix composition which was designed using the compressible packing method. A series of uniaxial tensile tests was performed under temperatures ranging from 25 to 1000°C. Thermogravimetry analysis were used to study the deterioration/phase changes as a function of the studied temperatures. Scanning electron microscopy (SEM) was used to study the damage processes in the fiber–matrix interfaces after exposure to high temperatures.

Keywords: thermo-mechanical properties, textile reinforced concrete, basalt fiber, high temperatures.