
Mechanical performance of new cement mortar composites reinforced with a combination of nano and micro-scale cellulose fibers

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Abstract.

The combination of the reinforcements at different levels can lead to a synergetic effect on the mechanical properties. In this work, the preparation and characterization of new cement mortars reinforced with conventional pulps at the micro-scale level and nanofibrillated cellulose fibres at the nano-scale level has been carried out. The conventional pulps have been obtained by subjecting sisal fibres to a soft mechanical treatment and the nanofibrillated cellulose pulps have been prepared by the application of a high intensity refining process. These pulps were incorporated and homogenously dispersed in cement mortars, and subsequently, the resulting pastes were cured for 28 days. The mechanical performance of the different composites was determined by flexure tests. The effect of the fibre combination on the mechanical performance of the obtained composites will be presented and analyzed, taking into account the multi-scale reinforcement.