

Ceramic tiles with very low density developed by the recycling of glaze residues

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The ceramic industry is large-generating waste that is usually deposited in landfills and the recovery and recycling are very attractive from the standpoint of economic and environmental solutions, being a reality today in ceramic industries. Therefore, this paper addresses the reuse of glaze waste derived from effluent treatment plant in the development of ceramic tiles for façades with low density. The glaze residue was characterized (XRF) and silicon carbide (0.05 wt. %) was added to the glaze waste as bubbling agent and CMC (10 wt. %) was added to the mixture as a binder. The mixture was granulated (7 wt. % water) and compacted by double loading using a standard grés paste as substrate according to a 2^k full factorial experimental design (DoE). The amount of grés paste in relation to the residue in the double loading and the compaction pressure were the factors. After drying, the compacts were fired in a roller kiln to 1180°C in 44 min cycle. The fired samples were characterized for the determination of the thermal expansion, modulus of flexural strength, water absorption and apparent density. The results clearly showed the effect of the double loading on these properties, and it was possible to obtain tiles with very low density (0.8 g/cm³) with cellular structure.

Keywords: Recycling, ceramic tiles, glaze waste, cellular ceramics.