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Recycling of rice husk ash as secondary material to produce eco-friendly construction bricks

Dolores Eliche Quesada, Jose A López-Pérez and Manuel A Felipe-Sesé
University of Jaen, Spain

Resource recovery and utilization of industrial by-product materials for making construction material has gained significant attention across the world. The main objective of this study is to investigate the effects of rice husk ash (RHA) addition in the production of eco-friendly construction bricks. This RHA in turn contains around 85–90% silica which is mostly in amorphous state, but depends on the burning temperature and time. The raw materials: clay and RHA was characterized by XRD, XRF, CNHS analysis, and thermal analysis and after, using conventional moulding and sintering processing methods to prepare clay–RHA composites. The influence of the amount of waste (0-30 wt %) added to clay and sintering temperature (900 and 1000°C) has been evaluated by a series of technological properties such as bulk density, water absorption and suction, apparent porosity and compressive strength. The results have shown that the optimum sintering temperature is 900 °C. About this temperature, at 1000°C, increased open porosity was observed, which decreased the compressive strength of the bricks. It was considered as the maximum permissible rate of addition of RHA 20 wt %, because higher additions have a strong effect on the properties of the obtained materials such as compression strength and bulk density which descending dramatically due to the large amount of porosity generated as reflected by high values of water absorption and suction. It was concluded that adding 10 wt % RHA to the clay to achieve values of compressive strength of 36MPa while gets to reduce the bulk density by almost 10%.

Biography

Dolores Eliche Quesada is an Associate Professor of Materials Science and Metallurgical Engineering of the University of Jaen, Chemical Engineer by the University of Granada and PhD in Sciences by the University of Malaga. Her research focuses on the valorization of waste in construction materials relating the microstructure of ceramic materials obtained with its physical, mechanical and thermal properties. She is author and co-author of more than 50 communications at national and international conferences, as well as more than 30 publications in international journals.

deliche@ujaen.es

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