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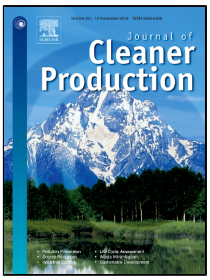

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Chao-qiang Wang, Xiao-yan Lin, Xu-dong Mei, Xue-gang Luo

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Performance of Non-fired Bricks Containing Oil-based Drilling Cuttings Pyrolysis Residues of Shale gas

Chao-qiang Wang [a,b,c,d]; Xiao-yan Lin [a,c*];Xu-dong Mei [b,d]; Xue-gang Luo [a,c]

[a] School of Materials Science and Engineering, Southwest University of Science and Technology, Mianyang 621010, Sichuan Province, People's Republic of China

[b] Chongqing Environmental Protection Center for Shale Gas Technology & Development, Fuling 400800, Chongqing , People's Republic of China

[c] Technology and Engineering Research Center of Biomass Materials, Ministry of Education, Southwest University of Science and Technology, Mianyang 621010, Sichuan Province, People's Republic of China

[d] Chongqing Environmental Protection Engineering Technology Center for Shale Gas Development, Fuling 408000, Chongqing , People's Republic of China

Abstract: The huge amounts of oil-based drilling cuttings pyrolysis residues (ODPR) are produced in oil and gas development field which can result in serious environmental safety problems. The experimental study of the feasibility of using ODPR has been represented in this paper as the replacements for finer aggregates and also as part of the cementitious materials found in bricks. Mechanical and physical properties, detailed environmental performances as well as microstructure analysis were carried out. However, hydrated products and the early hydration process of ODPR bricks were described using XRD, FT-IR, SEM and EDX. The results showed that ODPR had some pozzolanic characteristics and the recycled ODPR had a significant influence on the strength and durability of the non-fired bricks. The best properties were achieved with the help of 50% ODPR with a reliable durability which met grade M10 according to the Chinese standards (GB/T2542-2012). The environmental performance tests concluded that when ODPR acts as the recycled aggregates and you add the mixture for the preparation of the non-fired bricks, from the technical point of view, it wouldn't have been an environmental contaminant.

Key words: Shale gas; ODPR; Recycling; Aggregate; Brick

1 Introduction

The present study introduces ODPR's relevant information in details(Chao-qiang Wang et al., 2017; Chao-qiang Wang et al., 2017; Chao-qiang Wang et al., 2017). However, it is a type of oily solid waste. Binders like fly ash and cement were used to solidify or stabilize the residues(Kogbara et al., 2013; Kogbara, 2014; Kogbara et al., 2016). Residue contamination is always solved in a very short time. The residue undergoes different variations when buried underground for longer periods of time and this can lead to environmental security risks(Leonard et al., 2010; Antemir et al., 2010; Torgeir et al., 2013).

As a result, safe disposal of the ODPR into the environment, recycling resources by development and exploration of shale gas are, therefore, needed urgently. Fewer studies were concerned with the resource utilization of ODPR. In addition, they were used oil sand, oil-based mud or cuttings, an oil-gas well drilling waste, as a partial replacement for the limestone in the kiln feed(Abdul-Wahab et al., 2016; Mahmoud Kassem et al., 2018; Bernardo et al., 2007), as a