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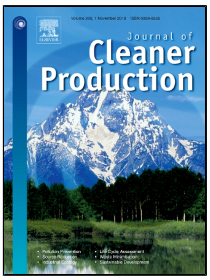

Utilization of lithium slag by wet-grinding process to improve the early strength of sulphoaluminate cement paste

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Utilization of lithium slag by wet-grinding process to improve the early strength of sulphoaluminate cement paste

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Abstract:

Lithium slag is a by-product of lithium carbonate industry; in the past decades, due to ascending demand of lithium salts, emission of this kind of solid waste is dramatically increased and results in serious environmental problem. Utilization of lithium slag is of great importance to the sustainable development of lithium carbonate industry. In this study, one new way to utilize lithium slag in sulphoaluminate cement system was attempted. Lithium slag was processed with wet grinding, in order to obtain fine particles and facilitate the ions dissolution. Addition of wet-grinded lithium slag was expected to improve the early strength of sulphoaluminate cement. The hydration mechanism was investigated in terms of setting time, hydration process, hydrates, and pore structure. The results show that lithium slag with D(0.5) of 3.04 μm, which is extremely difficult to be prepared in dry-grinding system, can be easily obtained with wet-grinding process; the ions dissolution of lithium, aluminum, and silicon phase can also be significantly facilitated in wet-grinding process. With the dosage less than 10%, wet-grinded lithium slag can notably promote the early strength of the sulphoaluminate cement paste, and the main reason for the promotion is not only because of the filling effect of fine particles and nucleation seed induction of nano particles formed in wet-grinding process, but also due to the fact that the dissolved lithium can noticeably facilitate the precipitation of hydrates to induce the cement hydration. The findings suggest that lithium slag has great potential to be utilized in

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