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Phosphate bonded natural fibre composites

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Abstract:

The demands for wood based composites along with increasing economic and environmental concerns on conventional wood products necessitate moving beyond the traditional processing methods to more cost-effective and environmentally friendly approaches. In the wake of a fast-setting phosphate binder with a low carbon footprint, this study investigates the potential of different waste residues incorporated in formulated magnesium and calcium phosphate binders to produce commercially-viable composite products. The residues include forest waste from alien invasive trees, agricultural processing waste such as bagasse and hemp hurds, and wood-based industrial residues including papermill sludge, waste paper and sawmill waste. A wide range of composite products were produced that met the requirements of Portland cement particleboard (EN 634: 2007). This study presents the result of the process optimization and test conducted to product technical specifications. The development of phosphate bonded natural fibre composites utilizing lignocellulosic residues promises to bring economic potential to developing countries.

Keywords:
Lignocellulosic residues, optimization, phosphate cement, wood composites

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