Prioritization of low-grade kaolinite and mixed clays for performance evaluation of Limestone Calcined Clay Cement (LC3): Multi-criteria assessment	
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Abstract: The global demand for cement is expected to increase in line with the growth of the construction industry. However, this increase in demand is paradoxical because the use of cement should actually be reduced due to the significantly higher levels of carbon dioxide (CO2) emissions it produces, which contribute to climate change (IPCC, 2022). The primary cause of the significant CO2 emissions in the production of ordinary Portland cement (OPC) is the clinker manufacturing process, during which CaCO3 is subjected to calcination at temperatures exceeding 1450 °C. Therefore, reducing the amount of clinker used in cement production is crucial for achieving carbon neutrality. One strategy to reduce the economic and environmental impact of modern cement is to replace the clinker with supplementary cementitious materials (SCMs). This approach is widely regarded as the most practical and robust alternative. However, most conventional supplementary cementitious materials (SCMs) being studied, such as fly ash, slag, and silica fume, are in limited supply (Scrivener et al., 2018). Alternatively, calcined clay and limestone are emerging as promising SCMs and are being used to create a ternary blend known as “LC3” (Limestone Calcined Clay Cement) (Avet and Scrivener, 2018). The latest research has recognized the significant contribution of clinker replacement in achieving carbon-neutral development of LC3 (Scrivener et al., 2019; Dhandapani et al., 2021). To ensure the binder's high integrity, the calcined clay must exhibit abundant pozzolanic performance. However, because clays can vary in their mineralogical and thermal properties, it is important to investigate the priority of each clay in order to develop LC3 with optimal performance.....