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Improvement of concrete radiation shielding for uses in medical applications and safe transport of radioactive waste; Review article

One of the most important factors in achieving sustainability in the field of safety of radioactive waste management and radiation exposure is the use of cheap, economical and available materials to create radiation shielding Green concrete (RSGC). Radiation shielding green concrete is made from environmentally friendly concrete waste, and this waste includes different types such as slag power plant waste, recycled concrete, mining and quarry waste, glass waste and furnace residues, burnt clay, sawdust, combustion ash, and casting sand. RSGC is considered a superior alternative to many types of traditional normal concrete in terms of shielding against the harmful radiation, and being economical and moldable. This review article provides critical reviews on RSGC performance in terms of radiation shielding characteristics, mechanical strength, and durability. Additionally, this article presents a comprehensive review on the subject, considering the classifications, alternative materials, design additives, and type of heavy aggregates used. Also, this work extensively reviews the trends of development research toward a broad understanding of the application possibilities of RSGC as an advanced concrete product for producing a very strong and green concrete composite for the construction of radiation shielding facilities as a better solution for protection from sources of radiation. Furthermore, this critical review provides a view of the progress made on RSCs, and RSGC and proposes avenues for future research on this hotspot research topic.

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