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(54) Title: METHODS FOR CARBON-CAPTURE WITHIN BIOCHAR

(57) Abstract: Methods for carbon-capture within a biochar are provided. The method includes mixing a biochar with an alkaline solution to form an intermediate mixture and exposing the intermediate mixture to a CO<sub>2</sub> source so as to precipitate calcium carbonate onto and into the biochar to form a CO<sub>2</sub>-weathered biochar. In some cases, the method also includes injecting CO<sub>2</sub> into alkaline wastewater to sequester/store CO<sub>2</sub> which can then serve as mixing water for producing cementitious composites. This method may be used to upcycle three waste streams, and treated CO<sub>2</sub>-weathered biochar preserves compressive strength of resultant concrete when substituted for a portion of the pre-cure cement and aggregate components. Further, treated CO<sub>2</sub>-weathered recycled aggregate preserves mechanical strength of resultant concrete when substituted for a portion of aggregate.



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