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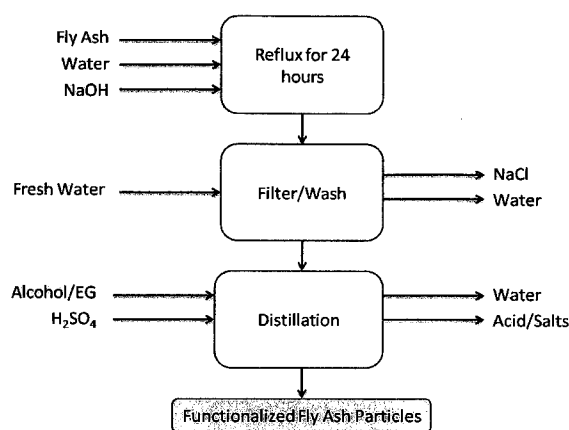


Fig. 1

(57) Abstract: Processes and methods of making and preparing, compositions and structural products therefrom are provided, whereby the surface area of alumino-silicate based powders is greatly increased and rendered chemically active so that when the functionalized powders are mixed with water poly-condensation reactions occur between the surfaces binding the powders together to form a structural material with negligible emission of carbon compounds. In another embodiment, the surface functionalized powders can be mixed with an additive; a dry aggregate, such as sand and water to make a slurry that can be poured or cast into any desired shape and rapidly cured to a hardened shape suitable for use as a structural material with the mechanical strength equivalent to Portland-cement based concrete products. In additional embodiments, the alumino-silicate based powders are nano-functionalized and foam functionalized to provide light weight and structurally strong materials that can also be used in combination with or as a replacement for Portland-cement.

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