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### Patent Search

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#### Abstract:

The present invention provides preparation of nano-silica from a cost competitive spent foundry sand by amenable depolymerization followed by sol-gel method (precipitation) The prepared nano-silica was characterized using different modern analytical techniques. In the present invention the prepared silica nanoparticles delivers particle size in the range of 8 nm to 100 nm. Further, the average particle size of the obtained nano-silica from sodium silicate of waste foundry sand was about 25 nm. The pore size and surface area of the synthesized nano-silica were found to be 5.5 nm and 345 m<sup>2</sup>/g respectively. The synthetic process using spent found sand developed in the present work for the preparation of nano-silica offers number of special features with regard to concentration of alkali silicate used, pH of the precipitation reaction, time, temperature and condition of aging and percentage yield. The yield of the nano-silica obtained was about 90 %. The value added nano-silica obtained in the present work from spent foundry sand can be used in different industrial applications such as fillers in concrete, desiccants, adsorbent sealants, and reinforcements Thus, the present invention is considered to be a cost competitive and breakthrough route that facilitates value addition to the solid waste.

#### Complete Specification

- Claims  
 We claim.
1. The novel process route developed for the production of alkali silicate from solid waste of waste foundry sand (WFS) through depolymerization mechanism supported by hydrothermal treatment using alkali over the temperature range between 125 and 250 ° C for the period of 6 to 24 hours. The preferred temperature and period of reaction to obtained maximum conversion of alkali silicate were 225 ° C and 3 hours respectively.
  2. A facile and efficient process route was developed for the preparation of silica nano-particles using alkali silicate obtained from waste foundry sand. The process involves the sol-gel followed by aging at open and closed condition. The preferable condition of aging is closed environment.
  3. The process of claim 2. where in the silica nano-particles prepared from different silicates namely sodium silicate and potassium silicate derived from waste foundry sand. The preferable alkali silicate used was sodium silicate.
  4. The process of claim 2, where in the concentration of sodium silicate used was in the range of 0.01 N to 2 N. The preferable concentration is 0.1 N.
  5. The process of claim 2: formation of silica nanoparticles is maintained in the different pH range between 3 and 10. The preferable pH is 8.
  6. The process of claim 2. where in the particle size of the silica produced was predominantly in the range between 6 nm and 100 nm. The average size of the silica particles obtained was 25 nm ±2.
  7. The process of claim 2, where in the surface area of the nano-silica obtained were in the range between 50 and 350 m<sup>2</sup>/g.
  8. The process of claim 2 where in the pore size of the nano-silica obtained were in the range between 4 to 9 nm diameters

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