Patent Search

Invention Title	PROCESS FOR THE PRODUCTION OF SODIUM SILICATE FROM SPENT FOUNDRY SAND
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Inventor

Name	Address	Country	Nationality
Dr.Mohamed Ismail Abdul Aleem	2/130, Udhaya Nagar, Ganapathy, Coimbatore- 641 006.	India	India
Mr. Kannadasan Kavikumaran	88/F, Pattarnal Street, Krishnapuram, Ambattur, Chennai- 600 053	India	India
Dr. Pichaimani Prabunathan	12B/2, Pennaiyar Road, Manjakuppam, Cuddalore 607 001.	India	India
Dr. Arumugam Hariharan	No. 1226, Vaigai Street, Sudhagar Nagar, L.N.Puram, Panruti 607 106, Cuddalore Dist, Tamilnadu.	India	India
Dr. Muthukaruppan Alagar	Plot 66, 5th Main road, Swaminathanagar, Kottivakkam, Chennai-600 041.	India	India

Applicant

Name	Address	Country	Nationali
PSG Institute of Technology and Applied Research	The Principal, PSG Institute of Technology and Applied Research Avinashi Road, Neelambur, Coimbatore 641 062, Tamilnadu.	India	India

Abstract:

The present invention provides a simple, facile and clean process route for the production of commercially potential sodium silicate precursor material from spent foundry sand through amenable hydrothermal method. The synthetic process route involves the depolymerization of fused crystalline mass of spent foundry sand using the solution of concentrated caustic soda over a period of 12 hours at 250 °C. The depolymerization of spent foundry sand and the formation of sodium silicate were ascertained from appropriate analytical techniques. The synthetic process route developed for the production of sodium silicate possesses number of special features with regard to the concentration of caustic soda, reaction time, temperature, work up methodology, yield and purity. The product sodium silicate resulted from spent foundry sand can be conveniently utilized for different household products and industrial applications, including the binding materials for the preparation of geopolymer concretes. This invention is considered as the novel method of industrial waste utilization and effective approach for solid waste management.

Complete Specification

We claim,

1. A novel process route was developed for the production of sodium silicate from solid waste of spent foundry sand through hydrothermal method using concentrated solution of caustic soda along with catalysts over the temperature range between 150 °C and 350 °C for the period of 6 to 36 hours.
2. The process of claim 1, where in the colour of the spent foundry sand was removed by thermal treatment of the sample over the temperature range of 500 to 600 °C for 4 to 12 hours and then cooled.
3. The process of claim 1, where in the colour removed spent foundry sand was mixed with small amount of acidic catalysts to disrupt the crystalline morphology of sample and to initiate the chemical reaction with caustic soda. The acidic catalysts used were nitric acid, hydrochloric acid, sulphuric acid and hydrofluoric acid, preferably hydrofluoric acid was used.
4. The process of claim 1, where in the concentration of hydrofluoric acid used was in the range of 1% to 5 % on the basis of percentage weight of sample. The preferable concentration is 2 %.
5. The process of claim 1, where in the color removed, surface modified spent foundry sand i sample was mixed with concentrated solution of caustic soda ranged between 2N and j 20N. The preferable concentration of caustic soda is 4N.
6. The process of claim 1, wherein the temperatures of the reaction was used over the range ! of 150 to 350 °C. The Preferable temperature is 250 °C.
7. The process of claim 1, wherein, the depolymerization of silica reaction was carried over a period of 6 to 36 hours. The preferable reaction time 12 hours.
8. The process of claiml, where in the yield of the product sodium silicate obtained from the reaction was calculated based on the weight percent of spent foundry sand

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