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Patent Search

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Inventor

Name	Address	Country	Nationality
Dr. ARUMUGAM HARIHARAN	1226, VAIGAI STREET, SUTHAGAR NAGAR, L.N. PURAM, PANRUTI, CUDDALORE-607 106, TAMILNADU	India	India
Dr. KRISHNASAMY BALAJI	103, STAFF QUARTERS, PSG ITECH, NEELAMBUR, COIMBATORE-641 062, TAMILNADU.	India	India
Dr. GOVINDRAJ LATHA	DEPARTMENT OF CHEMISTRY, PSG INSTITUTE OF TECHNOLOGY AND APPLIED RESEARCH, AVINASHI MAIN ROAD, NEELAMBUR, COIMBATORE-641 062, TAMILNADU.	India	India
Dr. MUTHUKARUPPAN ALAGAR	PLOT 66, 5TH MAIN ROAD, SWAMINATHANAGAR, KOTTIVAKKAM, CHENNAI-600 041, TAMILNADU.	India	India

Applicant

Name	Address	Country	Nationality
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	India

Abstract:

Production of active zinc oxide using zinc chloride obtained from industrial zinc scrap precursor was synthesized through wet chemical process route developed suitable for high performance industrial applications. In the present zinc chloride is converted into basic zinc carbonate using the combination of sodium hydroxide and sodium carbonate in alkaline condition at appropriate experimental conditions. The process route developed for the present invention for the production of active zinc oxide from zinc chloride through a facile environmentally friendly method. Among the process routes developed in the present invention, active zinc oxide synthesized from zinc chloride precursor using the combination of sodium hydroxide and sodium carbonate yielded better set of properties. The optimum pH and temperature for the precipitation of basic zinc carbonate are 7.5 and 65°C respectively. The preferred calcined temperature range for basic zinc carbonate is 230-260°C. The yield and assay of the active zinc oxide samples obtained are 90% and 98% respectively. The properties of active zinc oxide viz., bulk density, surface area, pore size and particle size obtained are 0.595 g/cmv5, 60 g/rrf, 20 nm and 20-100nm respectively.

Complete Specification

Field of invention

The present invention is related to the production of high performance active zinc oxide from appropriate zinc salt precursors prepared from industrial zinc scrap through a facile synthetic process route developed. The present invention offers a novel, facile, and cost competitive synthetic process route for the manufacture of nano-sized active zinc oxide with high surface area suitable for wide range of industrial and engineering applications including pharmaceutical uses. In the present invention zinc chloride obtained from industrial scrap is converted into basic zinc carbonate using the specific molar combination of sodium hydroxide and sodium carbonate in alkaline medium at an appropriate experimental condition. The basic

zinc carbonate is developed and used in the present invention in order to obtain nano-sized active zinc oxide with improved characteristic properties. In the present invention, in addition to the use of basic zinc carbonate precursor route for production of active zinc oxide, other zinc salt precursors route also used to ascertain and optimize the process route efficient for the manufacture of active zinc oxide. In the present invention, it was observed that the basic zinc carbonate precursor route developed for the production of active zinc oxide is considered as the most efficient route, since the basic zinc carbonate undergoes thermal decomposition at relatively lower temperature and yielded zinc oxide with higher surface area than those of other zinc salt precursors. The calcination of basic zinc carbonate releases carbon dioxide and water vapor, which in turn contributes to develop zinc oxide with sufficient pores and enlarged surface morphology to exhibit high performance behavior. The process route developed in the present invention is considered to be facile, cost competitive source material and environmentally friendly, since no harmful by products are released and the product obtained will be free from any impurities when compared with that obtained from other methods. The process route developed also possesses

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