Synthetic Zeolites Processed from Rice Husks

Rich husk ash is a rich source of silica and produced by incinerating the byproduct that results from winnowing rice to separate hull from grain. Widely considered a carbon neutral product, rice husk ash is an environmentally friendly resource for producing silica nanomaterials and synthetic zeolite. The proprietary production process used in this technology involves incinerating rice husks to produce silica and will be further treated with alumina and sodium silicate to synthesise the final product, which can be used in petrochemical industry as catalysts, water treatment as molecular sieves and ion exchanger for filtrations, and pharmaceutical industry for its surfactant and controlled release properties. The process can be tailored to produce zeolites with different cavity sizes, optimised to suit desired applications.

Potential Applications

- Oil & gas industry - cleaning agents, and catalysts in petroleum derivatives production
- Food industry - dessicants, filtration medium
- Pharmaceutical - adsorbents, whiteners and composites
- Water treatment - to improve water quality
- Rubber industry - reduce waste and save fuel

Customer Benefits

- Sustainable source of silica from agricultural waste and by product, rice husk ash
- Synthetic zeolites can be used in specialised, high value applications
- Zeolites have demand in a myriad of industries

Technology Features & Specifications

The technology describes a proprietary production process that extracts silica from rich husks and converts it into synthetic zeolites. The following steps describes the process:

- Incineration - to produce rice husk ash high in silica content
- Digestor and vacuum filtration - to extract and purify silica
- Mixer and autoclave with alumina and sodium silicate - to synthesise zeolite
- Vacuum filtrations and drying - to purify the final product
- Packaging

There are facilities available to produce up to 100 tonnes per year. Up to 50 tonnes of rice husks can be processed per month to produce 1.5 tonne synthesised zeolites per batch per day.

Market Trends and Opportunities

There are opportunities to value-add to agricultural waste like rice husk ash by converting the byproduct into zeolite. The global production of zeolites was 2.98 million tonnes of which synthetic zeolites were valued at USD 1.30 billion in 2013. The market is forecasted to grow at a CAGR of 7.33 percent over the period of 2013 to 2018. Zeolites are a group of hydrated aluminum silicates, which are available abundantly in nature. Zeolites are also synthesized industrially to suit specific application demands that are not met by natural zeolites. One of the key factors contributing to this market growth is the increased use of zeolites in catalysis and petroleum refining. The global zeolite market has also been witnessing the trend of increase in production capacities. However, the intense competition leading to price wars could pose a challenge to the growth of this market. This technology addresses production costs by employing a sustainable source of silica from processing rich husk ash, an agricultural by product.

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