Converting Waste Agricultural Biomass into a Resource.

How a Rice Miller an Earn Extra Income in Extraction of Ultrapure Silicon from Rice Husk Ash Project

About Silicon

Rice Husk, generally considered as agricultural waste, is mainly used for energy generation, and also used as raw materials to develop technological products such as high purity silica ash, silicon carbide and zeolites. A major inorganic component of Rice Huskis silica (about 20-30 wt. %). Upon leaching with mineral acid and calcination, silica with high purity in amorphous form could be extracted from RICE HUSK. In the past few years our group used ricse husk silica (RICE HUSKS) in the synthesis of different kinds of zeolites including NaY, BEA, MOR, and mesoporous MCM.

Rice Husk a, derived from burning of Rice Husk is also an agricultural excess. Rice Husk a is generally used as soil ameliorants to help break up clay soils and improve soil structure but is also used as silica source as an insulator in the steel industry and as a pozzolan in the cement industry. Being less carbonaceous, Rice Husk a could be easily coursed through heat-treatment to extract amorphous silica.6,7 In another couple of studies, Rice Husk a containing crystalline tridymite and α-cristobalite was used as an alternative silica source for the syntheses of BEA and ZSM-5 zeolites. A work characterized the ash produced from combustion of Rice Husk in fluidized bed reactor showing speed and continuity of the process.

Impurity optimized silicon is needed for the advancement of terrestrial photovoltaic power generation. Producing solar grade silicon from Rice Husks has been pursued. An integrated process flowsheet was developed and practiced that included initial leaching, reduction of Rice Husk ash (RICE HUSKA) and post-reduction purification of silicon. Metallothermic reduction of purified RICE HUSKA with magnesium was investigated within the temperature range of 500-950°C.

The reduction product was purified by two stage acid leaching sequence. Analysis of the final silicon powder product by XRD and ICP-OES showed crystalline silicon with boron content to be less than 3ppm- corresponding to reduction by a factor greater than 10, whilst the phosphorus content was reduced by a factor of over 20 and reaching less than 73 ppm.

Properties of Silicon

Silicon is a crystalline semi-metal or metalloid. One of its forms is shiny, grey and very brittle (it will shatter when struck with a hammer). It is a group 14 element in the same periodic group as carbon, but chemically behaves distinctly from all of its group counterparts. Silicon shares the bonding versatility of carbon, with its four valence electrons, but is otherwise a relatively inert element.

Process of Extraction

1. Digestion: This involves the digestion of the rice husk ash with caustic at specific conditions. In this process the silica in the ash is gets extracted with caustic to form sodium solution. After the completion of the digestion the solution is filtered for the residual undigested ash present in the solution. The clear filtrate is taken for precipitation.

2. Precipitation: This step involves precipitation of silica from the sodium silicate solution. Carbon dioxide at a specific flow rate is passed through the silicate solution at design conditions. Continuous stirring is employed during the operation. The precipitated silica is filtered, washed with water to remove the soluble salts and dried. The filtrate containing sodium carbonate is taken for regeneration.

3. Regeneration: Regeneration is the step where calcium compound reacts with the sodium carbonate to form calcium carbonate and sodium hydroxide. The resulting solution is filtered to remove the solid calcium carbonate and aqueous sodium hydroxide is used for digestion again. The calcium carbonate is washed with water and dried. The dried calcium carbonate can be either calcined to get calcium oxide, which is reused, for regeneration or the calcium carbonate is sold and fresh calcium hydroxide is used for regeneration which gives an option of one more value addition.

4. Production of Ultrapure Silicon:

A chlorine based system is used in the method of transferring silicon from SiO2 to polysilicon. The process is flexible enough to allow the use of chlorine as the halide conversion medium by

modifying the process, hydrogen, argon and a silicon chloride containing gas are injected into inductively coupled plasma operating at a temperature of approximately 2500°C.

Under these conditions, the silicon chlorides decompose to silicon, chlorine, and possibly hydrogen ions, and the gaseous product flows into a baffled cold trap held at approximately 1500°C. by resistance heating.

Silicon is used in the aluminium industry to improve castability and weldability, not to add strength as noted in the text. Silicon-aluminium alloys tend to have relatively low strength and ductility, so other metals, especially magnesium and copper, are often added to improve strength. Silicon resins are widely used as coatings, moulding compounds, laminates sealants, room temperature curing cements for electrical insulation, impregnating electric coils, bonding agents and vibrating damping devices.

Semiconductor grade silicon is used in the manufacture of silicon chips and solar cells. Fumed silica is used as filler in the cement and refractory materials industries, as well as in heat insulation and filling material for synthetic rubbers, polymers and grouts. Silicon rubbers are versatile materials, which find application in a wide variety of products. It is also used in medical devices used within the body (surgical).

Project at a Glance

Capacity:	300 Kg/day
Plant & Machinery:	Rs. 246 Lakhs
T.C.I:	Rs. 557 Lakhs
Rate of Return:	39%
Break Even Point:	46%

Tags

Silicon Extraction from Rice Husk Ash, Silicon from Rice, Investment Opportunities in Precipitated Silicon from Rice Husk Ash Project, Project on Silicon Extraction from Rice Husk Ash, Silicon from Rice Husk in India, Rice Husk ash fuel & Powder value added products, How to Earn Money from Rice Husk Ash, Processing Facility for Producting Silicon from Rice Husk Ash, Value Added Products From Rice Husk or Rice Hull Ash, Characterization of Rice Husk and the Process of Silicon From Rice Husk, Production from Rice Husks, Using Rice Husk Ash, Silicon as a by-product of Rice Husk, Rice Husk Ash, Manufacturing process of Silicon from Rice Husk Ash, Rice Husk (Rice Hulls), Handling of rice husk, Extraction Of Ultrapure Silicon From Rice Husk Ash, Manufacturing of Silicon from Rice Husk Ash, Production of Silicon from residual rice husk ash, Simple Method For Production of Silicon From Rice Hull Ash Synthesis of High Purity Silicon from Rice Husks, Silicon from Rice Husk Ash as an Additive for Rice Plant, Silicon Processing Plant, Preparation of Silicon from Rice Husk Ash, Silicon production from Rice Husk, Rice hulls,

Utilization of Rice Husk and their Ash, processing plant for production of silicon from Rice Husk ash, Forming products from rice husk, Rice Husks Project, Bioethanol Production from Rice Husk ash, How we can extract Silicon, Manufacturing Business Plans for Small and Medium Scale Business, Secret to Making Money by Starting Small Business, Small Business Ideas with Small Capital, Top Best Small Business Ideas for Beginners 2017, Small Business But Big Profit in India, Best Low Cost Business Ideas, Small Business Ideas that are Easy to Start, How to Start Business in India, Top Small Business Ideas in India for Starting Your Own Business, Top Easy Small Business Ideas in India, Small Investment Big Returns, Top Best Small Business Ideas in India, Business Ideas With Low Investment, Best Small Business Ideas in India to Start Business, 100% Risk Free Business, Profitable Small Business Ideas with Small Investment, Best Home Based Business Ideas, Best Part Time Business Ideas to Start New Business, Best Ideas for Low Budget Business and More Profits, Top Best Small Business Ideas for Women in 2017, Most Profitable Business Ideas with Low Investment, Easy Simple Best Unique Low Cost Small Investment, Start up Business Ideas, Small Business Ideas to Make Money, Top Profitable Small Business Ideas in India, Best Business Ideas for Rural Areas in India & World Top Best Small Business Idea, Invest Low, Low-Cost Business Ideas for Introverts,

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Our Detailed Project Report Contains

➢ Introduction

- Project Introduction
- Project Objective and Strategy
- Concise History of the Product
- Properties
- BIS (Bureau of Indian Standards) Provision & Specification
- Uses & Applications

➢ Market Study and Assessment

- Current Indian Market Scenario
- Present Market Demand and Supply
- Estimated Future Market Demand and Forecast
- Statistics of Import & Export
- Names & Addresses of Existing Units (Present Players)
- Market Opportunity

➢ Raw Material

- List of Raw Materials
- Properties of Raw Materials
- Prescribed Quality of Raw Materials
- List of Suppliers and Manufacturers

➢ Personnel (Manpower) Requirements

- Requirement of Staff & Labor (Skilled and Unskilled) Managerial, Technical, Office Staff and Marketing Personnel

➢ Plant and Machinery

- List of Plant & Machinery
- Miscellaneous Items
- Appliances & Equipments
- Laboratory Equipments & Accessories
- Electrification
- Electric Load & Water
- Maintenance Cost
- Sources of Plant & Machinery (Suppliers and Manufacturers)

➢ Manufacturing Process and Formulations

- Detailed Process of Manufacture with Formulation
- Packaging Required
- Process Flow Sheet Diagram

➢ Infrastructure and Utilities

- Project Location
- Requirement of Land Area
- Rates of the Land
- Built Up Area
- Construction Schedule
- Plant Layout and Requirement of Utilities

Along with project financials, as under:

- Assumptions for Profitability workings
- Plant Economics
- Production Schedule
- Land & Building

Factory Land & Building

Site Development Expenses

- **Plant & Machinery**

Indigenous Machineries
Other Machineries (Miscellaneous, Instruments, Laboratory Equipments and Accessories etc.)

- **Other Fixed Assets**

Furniture & Fixtures
Pre-operative and Preliminary Expenses
Technical Knowhow
Provision of Contingencies

- **Working Capital Requirement Per Month**

Raw Material
Packing Material
Lab & ETP Chemical Cost
Consumable Store

- **Overheads Required Per Month and Per Annum**

Utilities & Overheads (Power, Water and Fuel Expenses etc.)

Royalty and Other Charges
Selling and Distribution Expenses

- Salary and Wages
- Turnover per Annum
- Share Capital

Equity Capital

Preference Share Capital

- **Annexure 1 :: Cost of Project and Means of Finance**

- **Annexure 2 :: Profitability and Net Cash Accruals**

Revenue/Income/Realisation
Expenses/Cost of Products/Services/Items
Gross Profit
Financial Charges
Total Cost of Sales
Net Profit After Taxes
Net Cash Accruals

- **Annexure 3 :: Assessment of Working Capital requirements**

Current Assets
Gross Working. Capital
Current Liabilities
Net Working Capital
Working Note for Calculation of Work-in-process

- **Annexure 4 :: Sources and Disposition of Funds**

- **Annexure 5 :: Projected Balance Sheets**

ROI (Average of Fixed Assets)
RONW (Average of Share Capital)
ROI (Average of Total Assets)

- **Annexure 6 :: Profitability ratios**

D.S.C.R
Earnings Per Share (EPS)
Debt Equity Ratio

- **Annexure 7 :: Break-Even Analysis**

Variable Cost & Expenses

Semi-Var./Semi-Fixed Exp.

Profit Volume Ratio (PVR)

Fixed Expenses / Cost

B.E.P

- **Annexure 8 to 11 :: Sensitivity Analysis- Price/Volume**

Resultant N.P.B.T

Resultant D.S.C.R

Resultant PV Ratio

Resultant DER

Resultant ROI

Resultant BEP

- **Annexure 12 :: Shareholding Pattern and Stake Status**

Equity Capital

Preference Share Capital

- **Annexure 13 :: Quantitative Details- Output/Sales/Stocks**

Determined Capacity P.A of Products/Services

Achievable Efficiency/Yield % of Products/Services/Items

Net Usable Load/Capacity of Products/Services/Items

Expected Sales/ Revenue/ Income of Products/ Services/ Items

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- Annexure 15 :: Total Raw Material Cost
- Annexure 16 :: Raw Material Cost per unit
- Annexure 17 :: Total Lab & ETP Chemical Cost
- Annexure 18 :: Consumables, Store etc.,
- Annexure 19 :: Packing Material Cost
- Annexure 20 :: Packing Material Cost Per Unit

- Annexure 21 :: Employees Expenses
- Annexure 22 :: Fuel Expenses
- Annexure 23 :: Power/Electricity Expenses
- Annexure 24 :: Royalty & Other Charges
- Annexure 25 :: Repairs & Maintenance Exp.
- Annexure 26 :: Other Mfg. Expenses
- Annexure 27 :: Administration Expenses
- Annexure 28 :: Selling Expenses

- Annexure 29 :: Depreciation Charges – as per Books (Total)
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- Annexure 31 :: Depreciation Charges - As per IT Act WDV (Total)
- Annexure 32 :: Depreciation Charges - As per IT Act WDV (P & M)
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- Annexure 34 :: Tax on Profits
- Annexure 35 :: Projected Pay-Back Period And IRR

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Our Approach

Requirement collection

Thorough analysis of the project

Economic feasibility study of the Project

Market potential survey/research

Report Compilation

Contact Us

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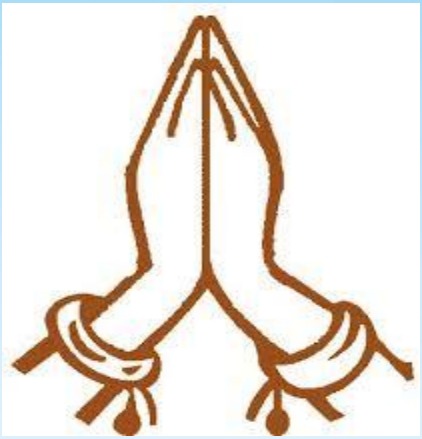

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