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## SYNTHESIS OF FE-BHA NANOCOMPOSITE AS OXYGEN CARRIER FOR CHEMICAL LOOPING COMBUSTION

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**ABSTRACT:**—Chemical looping combustion is a novel technique with inherent separation of the greenhouse gas CO<sub>2</sub> from atmospheric nitrogen in combustion of gaseous fuels. The selection of a suitable oxygen carrier which circulates between two fluidized bed reactors is a key issue for the performance of this technology. In this work, high surface area iron oxide based oxygen carriers and thermally stable Barium hexaaluminate carrier material were synthesized by co-precipitation and microemulsion templated sol-gel method respectively. The synthesized materials were characterized using different methods such as X-ray diffraction (XRD), Scanning electron microscopy (SEM) and Energy Dispersive X-ray Spectroscopy (EDAX). The XRD as well as SEM studies showed crystalline sizes of Fe<sub>2</sub>O<sub>3</sub> nanoparticle is 16.03 nm and BHA nano composite is 31.08 nm. The structural stability of Fe<sub>2</sub>O<sub>3</sub> and BHA nano structure confirmed by SEM images with different magnification.

**Keywords**— Chemical Looping Combustion (CLC), Nanocomposite, Co-precipitation, Nanoparticle.

## DESIGN & MANUFACTURING OF SPECIAL-PURPOSE MACHINE

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**ABSTRACT:**—Productivity and quality plays key role in the growth of manufacturing sector of India. Industries are basically meant for Production of useful goods and services at low production cost, machinery cost and low cost. To reduce production cost manufacturing efficiency plays significant role. In case of mass production variety of jobs are less compared to the quantity to be produced. Productivity can be improved by combining the operation. Development of special purpose machine is required to improve productivity. This paper deals with such a development of model. It can be used for operating on materials like thin metals as well as wood. In the present work, special-purpose machine is designed and developed which can perform four types of operations drilling, cutting, shaping and grinding. It will be useful to reduce not only cost but also time of production.

**Keywords**— spm, manufacturing, production, etc.

