1.0 Title

The synthesis of Porous Alumina Trough Sol-gel Combustion For Biomedical Application.

2.0 Researcher Details

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3.0 Collaboration partner

Clinical diagnostic laboratory expert in orthopaedic surgery.

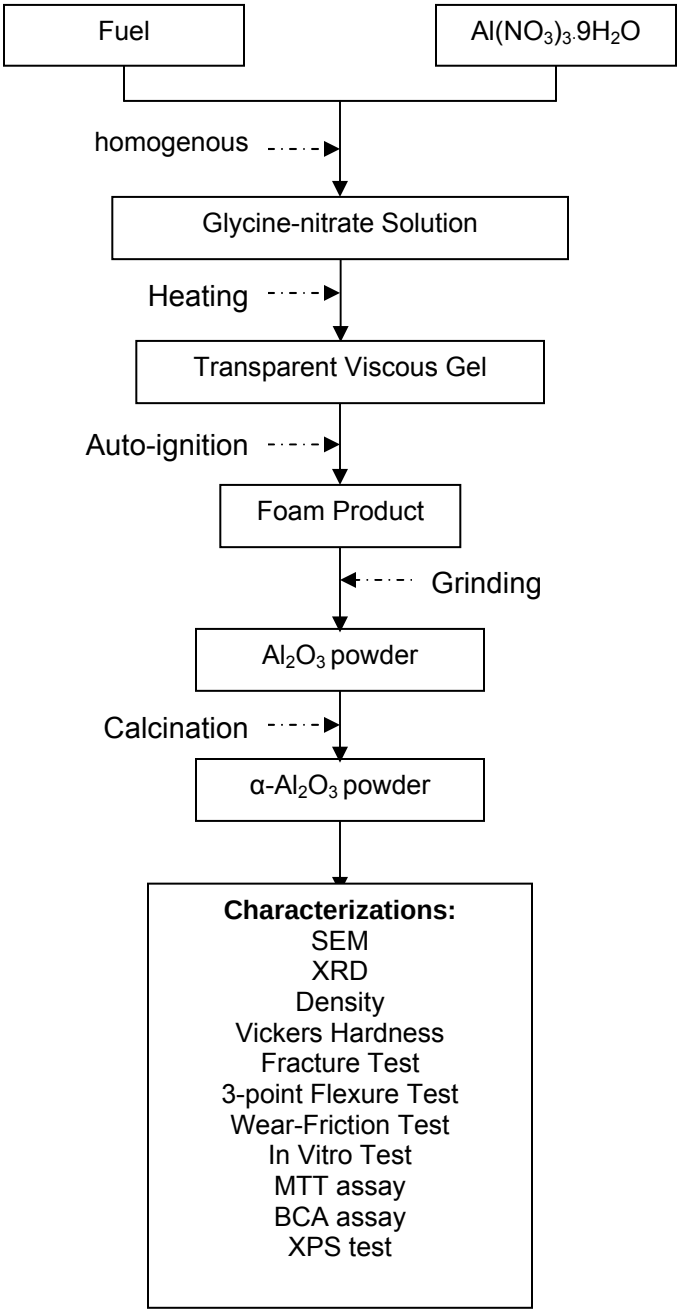
4.0 Objectives

1. To develop and optimize the pore structure of alumina that can provide better interfacial layer between the body cell and the devices for joint replacement.
2. Several parameters such as the mole ratio and types of fuel will be adjusted to achieve the required pore size range between 30 to 80 nm which has been claimed in the previous studies this range of pore size has improved the interfacial layer for osteoblast adhesion.

5.0 Methodology

Several types of fuels such as urea, citric acid, glycine and aspartic acid will be used separately together with oxidizer element (aluminium nitrate) in the preparation of porous alumina through sol-gel combustion. The mixture of fuel and oxidizer will be dissolved with minimum volume of deionized water and heat to ignition point until foamy product obtain. Foamy products are then grinding using agate mortar and will be calcined at 1100˚C with increment of 5˚C/min. X-ray diffraction execute on combustion-synthesized powders for phase characterization, using Cu Ka radiation. SEM micrographs will be recorded after coating the samples with gold. Mechanical testing will be done on the sintered body of porous alumina. Cell adhesion and proliferation will characterize using standard MTT assay. While the total protein measure using the BCA assay.

Surface concentrations on matrix production will characterize using X-ray photoelectron spectroscopy (XPS). Figure 1 shows the flow of the experimental.



Figur 1: Flow chart of the experimental

6.0 Research Outcome

The porous alumina produced will be used in osteoblast application as a device that can improved the interfacial layer of the implantation in joint replacement.