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LEHIGH UNIVERSITY

Fabrication of Interconnected Nano-Macro Porous Glass by the Melt-Quench-Heat-Etch Method

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Overview

This invention provides a superior method for creating interconnected nano-macro porous glass. It exploits the advantages of the conventional melt-quench processing, as well as allows for the introduction of controlled porosity without significant cracking. When applied to soda-lime phosphosilicate glass system it makes glass that has potential application as a superior bio-scaffold.

Applications and Advantages

In regenerative medicine a biocompatible material is needed to repair damaged or diseased tissue to its original state or function by helping natural healing processes to work faster with human cell cultures. This may be accomplished with scaffolds which act as 3-D templates for cell growth and formation of living tissues. Recently, scaffolds containing dual porosity at the nano- and macroscale have been claimed to exhibit better performance in terms of crystallization of hydroxycarbonate apatite, cell adhesion, proliferation, and also vascularization. The present invention provides a method for preparing a silica-based bioactive scaffold, based on the melt-quench procedure that induces phase separation. The glass is heat-treated to produce complex microstructures consisting of phase separation and crystallization at nano- as well as macro-scales, followed by selective leaching of multiple phases. The newly demonstrated "melt-quench-heat-etch method" results in an interconnected porous glass, which is structurally stronger than the ones prepared by other methods and optimized for enhanced bone regeneration performance. The same method can be extended to other compositions that show spinodal phase separation, which will be more suitable for applications other than bioscaffolds, such as:

- matrix drug delivery
- catalysis
- separation of fluids
- etc.

Status of Intellectual Property

A US utility patent application and patent cooperation treaty (PCT) have been filed.

Lehigh ExpertNet

- **Himanshu Jain -** http://expert1.cc.lehigh.edu/LehighExperts/ExpertDetail.aspx?ExpertID=70025964

Licensing Opportunities

- Exclusive
- Non-exclusive
- Research Sponsorship
- Product Development Partnerships (PDP)

Lehigh Case # 011807-01