

Response to Cellular Doping of Highly Porosity Alumina with P, Mg and Si

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Abstract

We know that Aluminium (Al), Calcium (Ca), Phosphorus (P), Magnesium (Mg) and Silicon (Si) are the elements which we can find in our nature resources. These elements consist some important parts of an atom which content are electron, proton and neutron inside the atom. These all elements are related to our cellular body which is highly using for increasing our immunity and metabolism to fight with foreign particles.

Keywords: Foaming • Porous alumina • Doping • Cellular response

Introduction

Aluminium (Al)

It is chemical element with the symbol Al. The atomic number is 13. It has density lower than other common metals. It takes 3 shell that on shell K, L, M, and stand on 2, 8, 3.

Calcium (Ca)

It is one of the elements where we can find on alkaline earth metal group. Its symbol is Ca. Its atomic number is 20. It took 4 shells that are K, L, M and N it stands like 2, 8, 8, 2. We can find this material in our human body because it is abundant material for human.

Phosphorus (P)

It is non-metallic chemical element of the part of nitrogen family. Its atomic number is 15. From room temperature it can change its colour less, soft, waxy solid that which glows in the dark. It took 3 shell that K, L, M, that configuration is 2, 8, 5. It is mainly help for growing the teeth and bones. It plays an important roleplay in human body.

Magnesium (Mg)

It is chemical element which we can find on the alkaline earth metals on group of 2. It is very lightest in structural metal. Its compound is used in construction for medicine. And magnesium is least of the elements essential to all cellular life. Its atomic number is 12. It consists of 3 shells on it that are K, L, M that are 2, 8, 2.

Silicon (Si)

It is also a non-metallic chemical element from carbon family. Silicon makes up 27.7 percent earth crust and it is a second most abundant element in the crust which being surprised in the crust only by oxygen. Its atomic number is 14. It has 3 shell to stand on it that are K, L, M, and it on that 2, 8, 4. It is mainly used for making alloy.

Alumina could be used as a porous ceramic biomedical implantation. Alumina is the first commonly significant to the part of bio ceramic. It has been required to use in biomedical applications that require application like

hardness, low friction, and chemical stability, for example dental implanting and acetabular cup for replacement in total hip prostheses.

Calcium and phosphate coating is known to be bioactive and there for doping with Ca and P was trailed. The combination of the foamed alumina containing high porosity in nature, which is tiny in size, which pores in interconnectivity and strength when we doped to improve our quality on bioactivity, could uniquely combine those properties which required for biomedical applications nowadays.

The key to focus of this study which we did that an optimal product of from foaming method used to produce more on a high porosity alumina that minimum size is 300 μm , with that degree of pore interconnective and very high compressive strength, doped it with chemical elements like Ca, P, Si, Mg and test the cellular response compared to the control foamed alumina.

Previously, ammonium sulphate molecule of fraction in the aluminium or ammonium sulphate blend to refer as the ammonium (NH) molecule of fraction (AMF), foaming temperature and the sintering temperature were varied. The optimal product was produced with 0.33 AMF, foaming at 100°C/h and heating point at 1600°C. With calcium (Ca), phosphate (P) and magnesium (Mg) to dilute at 10% are saturated at 100% concentrations. They were soaked in the solution for 24 h and dried to 900°C with a step increment of 100°C/h. The main stock of calcium (Ca), phosphate (P) and magnesium (Mg) solutions were made by adding exceeds salt to distilled water at room temperature and allowed to settle before decanting the by the salt solution into a glass container.

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