Abstract Submitted
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Investigation of silicon complexes in Si-doped calcium phosphate bioceramics[1] P. GILLESPIE, M.J. STOTT, M. SAYER, Department of Physics, Queen's University, Kingston, Ontario, Canada, G. WU, Department of Chemistry, Queen's University, Kingston, Ontario, Canada — Silicon doped calcium phosphate materials have drawn great interest as bioceramics for bone repair due to their enhanced bioactivity. However, the low level of doping in these materials, generally $\sim$1 wt.%, makes it difficult to determine the effects the silicon has on the structure of these materials. In this study, silicon substituted hydroxyapatite (Si-HA), silicon stabilized alpha tricalcium phosphate (Si-TCP), and a multi-phase mixture consisting of approximately 75% Si-TCP with the remainder being mainly Si-HA have been synthesized using isotopically enriched silica containing ^{29}Si. ^{29}Si magic-angle spinning nuclear magnetic resonance spectroscopy (MAS-NMR) has been used to examine the silicon complexes within these materials resulting from the substitution of SiO_4^{4-} for $PO_4^{3-}$and the required charge compensation mechanism needed to achieve this. Previous ab initio studies on these materials have investigated charge compensation mechanisms to suggest possible silicon complexes and these serve as a basis for interpreting the NMR results.

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