

Heated and plasma treated silicon nitride with different sintering additives for biomedical application

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Different compositions such as calcium silicate, cerium oxide, bioactive glass, and the combination of silicate compound with magnesium, silica, and calcium was studied as sintering additives of silicon nitride. The aim is to select sintering additives which form after sintering and/or post sintering treatment surfaces suitable for biomedical applications. As shows in the fig1. the samples were evaluated with their respective additives to see the transformation of phase

The processing parameters, such as initial composition, sintering temperature and time were determined, and the mechanical properties and microstructure of prepared silicon nitride-based materials were studied. The work was also focused on the modification of the surface using plasma etching and thermal technique. Parameters such as ratio of gases, exposure time, and nozzle distance were studied in order to find the optimal surface modification conditions.

Furthermore, the biological response of the surface was analyzed to determine its bioactivity using viability of fibroblasts cell and cytokine anti-inflammatory assays.

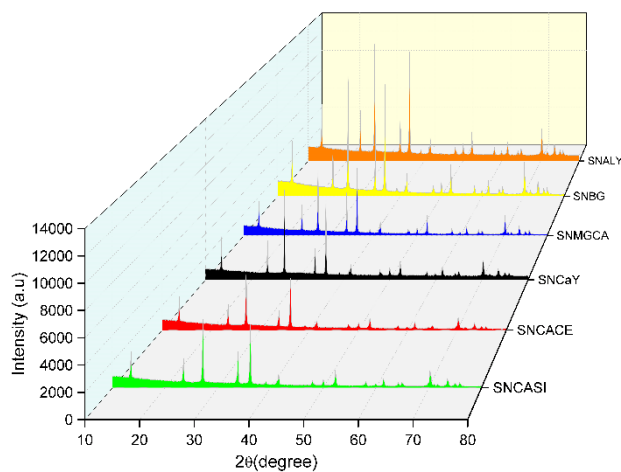


Figure 1 XRD analysis of silicon nitride with different sintering additives