HYDROXYAPATITE ALUMINA COMPOSITES

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In the present study, the effect of sintering on alumina (Al\textsubscript{2}O\textsubscript{3}) doped commercially available synthetic hydroxyapatite (CSHA) composites were investigated via a series of analysis and mechanical tests. The rates of Al\textsubscript{2}O\textsubscript{3} were in weight %2.5 and %5. Sintering temperatures were change between 900°C and 1300°C. Experimental results show that CSHA powders are stable up to 1100°C, but it starts to decomposition at higher temperatures and occurs in HA matrix some second and/or third phases such as ?-TCP, ?-TCP and CaO. Due to the formation of these phases compressive strength of CSHA powders drastically decrease at elevated temperatures. However, Al\textsubscript{2}O\textsubscript{3} doped samples are stable up to 1200°C, this is related to reduction of undesirable phases and also grain growths via doped material. Some calcium aluminum oxide phases such as CaAl\textsubscript{2}O\textsubscript{4}, CaAl\textsubscript{4}O\textsubscript{7} and Ca\textsubscript{2}Al\textsubscript{3}O\textsubscript{6} were detected for CSHA- Al\textsubscript{2}O\textsubscript{3} composites. This are related to formation of reactions between CaO and Al\textsubscript{2}O\textsubscript{3}. After SEM analysis, microcracks were identified for CSHA powders sintered at 1200°C and 1300°C. No microcracks were observed for CSHA-Al\textsubscript{2}O\textsubscript{3} composites at same temperatures. While the highest density and hardness values were obtained to pure CSHA as 3.06 gr/cm\textsuperscript{3} and 4.62 GPa, the highest compressive strength was obtained to CSHA-5A samples sintered at 1200°C as 214 MPa.

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