Plenary Speech by Dr. Rajitha Gunarathne

Processing Innovative Composite Products from Eppawala Chloroapatite

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As a developing country, it is economically beneficial for Sri Lanka focusing more on the sustainable value addition of its natural resources. As a natural phosphate source, the Eppawala Rock Phosphate deposit located at the ancient Anuradhapura district has been considered mainly as a raw material for the production of Phosphorous fertilizers. Considering that, this study explores processing novel composites for industrial application from non-renewable Eppawala Chlorapatite.

First, Chlorapatite mineral was converted into Hydroxyapatite, a kind of ceramic and bioceramic properties using Sol-gel routes and Solid-state sintering techniques. Then considering its bioceramic properties, it was incorporated with Methyl methacrylate (MMA) and 2- hydroxyethyl methacrylate (HEMA) liquid monomers to process bioceramic composites for orthopedic and dentistry applications. Synthesized ceramic varieties and processed bioceramic composites were characterized using PSA, XRF, SEM with EDS, FTIR, XRD, TGA. Also, a cost analysis was carried to find out the economic impact of synthesized products on the Sri Lankan economy. Results were compared and contrasted with commercial products and human hard tissues to find out suitability for biomedical applications.

Next, synthesized Hydroxyapatite varieties were reinforced with polyester, epoxy, E- Glass fibers, Silicon carbide (SiC), and Boron nitride (BN) to process composites for several industrial applications. Processed composite types were analyzed with SEM with EDS, FTIR, XRD, DSC, Tensile test, Impact test, DMA, and TGA. Results were compared with each other to find out suitability for automotive and other industrial applications.

The study concludes that Eppawala Chlorapatite can be directly converted into Hexagonal Hy-