

## Processing and characterization of egg shell derived Hydroxyapatite (HAp) and HAp reinforced AZ91 alloy composite

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An economical laboratory procedure to synthesize powder Hydroxyapatite (HAp) from bio-waste, eggshells, is developed. This technique entails crushing of eggshell, firing the eggshells at elevated temperature in furnace, mixing chemical compound and then again keeping the mixture at higher temperature. The produced HAp is then crushed to produce the finishing product in powder form which is then characterized by X-Ray Diffraction (XRD) technique. The produced Hydroxyapatite (HAp) is then reinforced into AZ91 alloy powder following powder metallurgy technique to produce a Metal Matrix Composite (MMC) to obtain a composite with adjustable mechanical and corrosion properties. In this study, we utilized AZ91 alloys as the matrix and the HAp powder particles as the reinforcement and the MMCs were studied for mechanical and corrosion resistance property. MMCs with 18% HAp showed 2 times higher hardness than the MMCs with 0% HAp. The MMCs with 0% HAp showed 4 times higher weight gain and 3 times higher weight loss than that of the 18% HAp MMC samples in simulated marine water. In summary, HAp reinforced AZ91 alloy composites exhibit adjustable mechanical and corrosive properties.