

Sri Lankan Corundum for Tribological Applications

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Sri Lankan corundum has been famous all over the world as precious gemstones like ruby and sapphire for several centuries. However industrial use of Sri Lankan corundum has not been tried so far. Expected high erosive wear resistance of corundum, which will be an advantage in its industrial applications, is one of the important properties that should be investigated before selecting it as an industrial material.

A set of experiments was conducted using Sri Lankan natural corundum extracted from gem gravels in different parts of the country to investigate their tribological properties, especially slurry erosive wear resistance. Synthetic corundum, which is commercially available and widely used in industrial applications, but expensive, was also used in this investigation to assess the viability of natural corundum as an industrial material.

A slurry pot tester was constructed where silicon carbide particles suspended in distilled water were used as the erodent. Specimens were mounted on a nylon disk which was rotating at constant speed while being immersed in this slurry. Erosion of the specimens was determined as a function of time by measuring the mass loss of all three materials at regular intervals.

This study showed that these Sri Lankan natural corundum specimens are comparable or even better in wear resistance than the commercially available synthetic corundum. Especially the pink color corundum from Marapana shows considerable lower slurry erosion hence higher resistance for wear than synthetic corundum. When considering the fact that Sri Lankan corundum is abundant as a waste in gem mining having no commercial value, this study will possibly open industrial opportunities for these cheaper but better wear resistive materials. Further mineralogical and tribological investigations are being carried out in order to explore the potentiality of them for industrial applications.

Key words: Morundum, Mineralogical, Tribological