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Quality improvement of locally available calcite for paint industry

A A D J R Priyadarshana, S S Liyanage*, and N S Kottegoda
University of Sri Jayewardenepura, Nugegoda.

Calcite ($CaCO_3$) is one of the commonly used extenders in paint industry. Though calcite is readily available in Sri Lanka imported calcite is preferred over the local form since it gives a better gloss finish in paint productions.

This study focuses on investigation of improvement of quality of local calcite to promote use of locally available calcite in Sri Lankan paint industries. Initially the crystal structure, particle size and percentage purity of the local and imported calcite, which are commonly available in Sri Lanka, were studied.

The samples were characterized using Powder X-ray Diffraction(PXRD), Fourier Transform Infra Red spectroscopy(FTIR), Chemical Analysis and Light Scattering, Particle Size Analysis Techniques.

PXRD confirmed that both imported and local mineral have the same crystal structure which is similar to that is reported for pure calcite in ICDC (database of inorganic crystal structures) database. This observation suggests that there is no solid solution formation with $MgCO_3$ or other mineral in the locally available calcite forms. However, chemical analysis confirmed that there is a small percentage of $MgCO_3$ in the local calcite compared to the imported material, which was under the detection limit of PXRD. The particle size distributions of both types of calcite were studied using particle size analyzer and light scattering experiments. These techniques provided consistent particle size distribution, where the local form contained a wide range of particle size distribution (0.4 μm – 9 μm) compared to the imported form, which has approximate particle size of 3 μm.

Attempts were also made to remove impurities in local calcite using sodium lauryl sulphate, and the method successfully removed most of the impurities present in the sample.

Further attempts were made to coat the local calcite, with commercial dispersion agent (Tamol), which gave an improved gloss finish to the local calcite.

*suda@sjp.ac.lk Tel: 011-2804206