A study on the HFNP by using Mineral Carbonization Method

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Many kinds of silicate-minerals are used for concrete filler materials. In case of Korea, waste concrete accounts of approximately 63% from construction waste; a total of 198,000 tons generated per day. Most of them are re-used as aggregate material in new concrete. During the construction waste recycling process has a large amount of concrete sludge that by-product composed fine ca-silicate power and limewater as well.

The concrete sludge was strongly alkaline and rich in calcium(Ca) as a result of calcium hydroxide($Ca(OH)_2$) dissolution when wet grinding from the concrete particles. The size distribution of concrete sludge is very narrow formation as mostly under the 75μm(96%) from 0.1 μm to 70μm. Before the mineral carbonization with HFNP(High Functional Nano Particle), it treated the classification of fine particles by using a multi-step hydrocyclone. The classification is efficient and environmentally-safe use of by-product sludge from waste concrete treatment. This system appropriately clssified with there different particle sizes. Using the under 2μm particle size particles would be adopted making a HFNP. The previously, the study of a carbon mineralization process for the neutralization of Ca-rich alkalie waste-water was successfully demonstrated from both environmental and economic perspectives last year. This year, the mineral carbonization process using under 2μm particles was conducted to consider of how to make a HFNP, first. A schematic experimented flow for producing HFNP suggested. And showed SEM-EDX image that $CaCO_3$ was completely coated on to the fine particle surface, which is confirmed by the morphological charge of solid surface. Silica and aliminium composing the fine particles were removed by $CaCO_3$ precipitation onto the surface through mineral carbonization process.

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