Innovative CKD Treatment

Maier, Lukas
Klotz, Dominik

Cement Kiln Dust (CKD) is an off-specification byproduct of cement clinker production, about 80 million yearly tons accrue. Due to its high alkali share, CKD is unsuitable for use in cement and being landfilled. As resource depletion rises, the zero-waste principle becomes more and more important. We developed two possible procedures to utilize CKD: Converting the Dust into a fertilizer The idea was to develop a wet chemical way to separate the contained metals, making them avaible for secondary metallurgy, from the calcium component and transform the last into a plant available calcium double super phosphate fertilizer. Thermochemical contaminant removal Using a combination of an inductive heating reactor and a boiling water granulation, we planned to produce highly amorphous granules. While the alkali- and heavy metals should be immobilized, the resulting product should be suitable for use in cement. We were able to separate CKD into a fraction consisting of various metal phosphates, offering potential for secondary metallurgic retrieval, and a Calcium phosphate fertilizer fraction, which was analyzed and fulfilled all legal limits for fertilizers. In the thermochemical contaminant removal, alkali metals evaporated and precipitated on colder reactor regions. As the alkali level is reduced by 70 %, the granule can now be used in cement. XRD Scans confirmed the functionality of the boiling water granulation to produce a highly hydraulic active product. Both processes show potential for industrial size application. All in all, we are one step closer to our personal goal: the realization of the zero – waste philosophy.

Awards Won: