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Applications of carbide slag in the wet desulfurization process for flue gas

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In China, the output of polyvinyl chloride (PVC) reached to 13.7 million tons, and nearly 80% of the production used the calcium carbide method. Meantime, 20 million tons of carbide slag was obtained as waste solid in the production of PVC. The extremely rough disposition of stacking and being open to the sky has not only occupied precious land but also polluted the earth and shallow groundwater. Besides, numerous industrial processes emitted great amount of SO_2 and other pollutants. Under the background of waste solid and air pollution control, we developed a wet desulfurization process for flue gas using carbide slag as desulfurizing agent. Double tower absorption technology was used. The desulphurization efficiency was more than 96% with the utilization rate of desulfurizer being above 90% by optimizing the feeding speed, water circulation, and the oxidation and crystallization of calcium sulfite. The technology has been applied in some chemical plants in the middle and western China, where the calcium carbide process majorly distributed.

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Culture - Circular aquaculture

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Aquaculture continues to increase production because the supply from capture fisheries does not satisfy the demand of the growing human population. Beyond that, the climate change affects conventional aquaculture production systems that are connected with the biosphere. The area of conflict embraces hazardous environmental conditions, possibly caused by the aquaculture itself, extreme meteorological situations, or industrial disasters. The environmental impact of aquacul-ture is always in focus of science, stakeholders, and politics. A major milestone is the develop-ment of recirculating aquaculture systems (RAS) that are operating independently from envi-ronments. A worldwide unique project of HTW Saar is the large marine fish farm near Saar-brücken. This project proves the feasibility of urban aquaculture. In an experimental scale, RAS production is already linked to agriculture production. RAS technology opens windows for the reuse of dissolved nutrients that are generated in aquaculture production processes. A source of valuable nutrients becomes available for agriculture, i.e. fruit and vegetable gardening as well as large scale production of microalgae. While vegetable gardening supplies food, microalgae are industrial raw material. The application includes pharmaceuticals and nutraceuticals. A promising field is the next generation of biofuel, if sustainable sources of nutrients are allocated. RAS aquaculture has special potential because it delivers nutrients dissolved in its process water. The nutrients can selectively be transferred to autotrophic production that is based on solar radiation. An aspect of decisive importance is the management of the material flows. Circular production depends on the coupling of processes and requires novel model based process technology.

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