Value-added sulfur scrubbing

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Power plants that burn fossil fuels remain the main source of electricity generation across the globe. Modern power plants have scrubbers to remove sulfur compounds from their flue gases, which has helped reduce the problem of acid rain. Now, researchers in India have devised a way to convert the waste material produced by the scrubbing process into value-added products. They describe details in the *International Journal of Environment and Pollution*.

Fossil fuels contain sulfur compounds that are released as sulfur dioxide during combustion. As such, flue gas desulfurisation (FGD) has become mandatory in most of the developed world. There are numerous methods, but most are based on wet limestone and caustic scrubbing. Wet limestone scrubbing generate s large quantities of solid gypsum waste, while wet caustic scrubbing generates alkaline waste containing aqueous mixture of bisulfite, sulfite and sulfate. Sulfate can be removed from water by desalination processes such as reverse osmosis and ion exchange, but these are expensive.

Rima Biswas of the National Environmental Engineering Research Institute (NEERI), in Nagpur, in India, and colleagues have designed a chemo-biological approach for treating the sulfate-rich effluent generated during wet scrubbing of flue gas emissions from fossil fuel fired power plants. The technique involves microbial sulfate reduction using an anaerobic up-flow packed bed bioreactor containing microbes, with ethanol as the carbon source essential for microbial growth.

The team found that more than 90% of the total equivalent sulfate

present in the effluent was reduced to sulfide at a rate of up to 3 kilograms per day per cubic meter of sulfate residue. In this form the waste can be easily converted into elemental sulfur for industrial use or into metal sulfide nanoparticles for research.

More information: "A chemo-biological treatment of scrubbing water from power plants with recovery of value-added products" in *Int. J. Environment and Pollution*, 2010, 43, 129-142.

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