

Treatment of waste-air containing highly concentrated-hydrogen sulfide with high loading using hybrid system composed of a photo-catalytic reactor and a biofilter

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The transient behavior of hybrid system composed of a photo-catalytic reactor and a biofilter was observed at the height of each sampling port to treat waste-air containing hydrogen sulfide highly concentrated up to 1000 ppmv with high loading. The biofilter packed with mixed media (of granular activated carbon and compost) was inoculated with a pure culture of Thiobacillus sp. IW, while the photo-catalytic reactor was composed of 15W UV-A lamps and annular pyrex tubes packed with glass beads coated with TiO₂ sol before calcination. The maximum elimination capacity of a biofilter-only process was 95 g/m³/h. On the other hand, the maximum elimination capacity of a hybrid system was observed to be 140 g/m³/h. The contributions of the photo-catalytic process to the hybrid system-elimination capacity turned out to consist of a direct (37–55%) one and an indirect (45–63%) one for the removal of highly concentrated hydrogen sulfide with high loading of 232 g/m³/h. However, the indirect contribution of the photocatalytic process could not be estimated for the stages of lowly-loaded hybrid system run.