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First Results of a Long-term Inhalation Study with nano Bariumsulfate

Abstract *

CeO₂ and BaSO₄ are both granular poorly soluble particles. They were tested in a long-term inhalation study in rats. The in-life phase was completed end of 2015; first results on BaSO₄ are presented in this talk. The study is funded by the German Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), Federal Institute for Occupational Safety and Health, FKZ2325, NanoREG project (FP 7/2007-2013, 310584) and BASF SE.

Female rats were exposed to nano-BaSO₄ (NM-220; 50 mg/m³) for 24 months. Animals were examined after 1, 3, 12, and 24 months of exposure; an additional group of animals was examined 6-month post exposure. nano-CeO₂ (NM 212, see Schaudien *et al.* at this conference) was tested in parallel.

Despite the high aerosol concentration, the lung burden of BaSO₄ exposed animals was relatively low after 3-month exposure (1.7 mg per lung), which steeply increased to 10 mg after 12 months.

Broncho-alveolar lavage did not reveal changes in the lung after 1-month exposure. After 3 months, an increase of neutrophils was observed, which progressed to several adverse findings comprising alveolar/interstitial inflammatory cell infiltration, interstitial fibrosis and alveolar lipoproteinosis after 12- and 24-month exposure.

This study revealed the initial fast lung-clearance of BaSO₄ and a slow-down after one year. The effects in the lung correlated with the lung burden but were low (compared to effects by lung burdens of CeO₂). Overall, BaSO₄ was found to be a particle of low toxicity but partly bio-soluble.

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