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The first personal exposure data for tungsten oxide fibres, in two hard metal manufacturing industries is presented. Occupational exposure was studied by static and personal measurements during tungsten metal production. Three different initial materials were used, ammonium-paratungstate (APT), blue oxide and tungsten trioxide. In both factories, airborne tungsten oxide fibres were detected both in static and personal samples. Fibre exposure varies for different activities. Charging of raw material, changing the hammer, cleaning-work on the cyclone and the micro-filter were found to be among the most high dusty operations. However, as workers use respirators during cleaning operations, these filters could not be related to personal exposure. The calcination of APT to the blue oxide generates fibrous dust. The raw material imported as blue oxide is also fibrous material and both charging it into the calcination furnace and re-charging it into the reduction furnace generates unnecessarily additional dusty periods. A single reduction-stage is, therefore, preferable. Furthermore, the tungsten trioxide raw material is non-fibrous, therefore, calcination of APT to tungsten trioxide and its reduction to tungsten metal is preferable with respect to minimising workers exposure to tungsten oxide fibres.

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In vivo cytotoxicity including cellular metabolic activity, lysozyme content and total protein content in rat bronchoalveolar lavage, capacity of interleukin-1 released from rat pulmonary cells and fibrogenic effects evaluated from rat lung dry weight, collagen content of the whole lung and pathological grading induced by mineral dust were assayed. The results showed that: (1) The relationship among in vivo cytotoxicity, interleukin-1 release, fibrogenic effects on the lung induced by mineral dusts correlated well with the free SiO2 content in mineral dusts in most (but not all) cases; (2) The biological harmful effects of mixed dusts were not simply the additive effect of single dust. In the group of WO3-SiO2 mixture, the fibrogenicity was mainly due to SiO2, tungsten trioxide (WO3) showed neither fibrogenic effect, nor significant potentiality to enhance SiO2 fibrogenicity, while in the group of SnO2-SiO2, SnO2 was suppressive to the effect of SiO2, although the contents of SiO2 in the two mixed dusts were similar.