Biodurability and release of metals during the dissolution of chrysotile, crocidolite and fibrous erionite

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The mechanisms of fiber dissolution in the lungs and subsequent release of metals in the extracellular/intracellular environment must be taken into account. [1,2,3].
For the first time, the kinetics of release of metals during the acellular *in vitro* dissolution of chrysotile, crocidolite and fibrous erionite were determined.
The kinetics of release of a representative selection of metals were determined over a period of three months. Despite the fact that the difference in Fe content between chrysotile and crocidolite is one order of magnitude, the much faster dissolution rate of chrysotile compared to crocidolite prompts greater release of available active surface Fe in the first weeks of the dissolution experiment and comparable amounts after 90 d. Such active iron may promote the formation of toxic hydroxyl radicals. The fast release of metals like Cr, Ni and Mn from chrysotile is also a source of concern whereas the release of V in solution is negligible.
Because chrysotile undergoes fast dissolution with respect to crocidolite and fibrous erionite, it behaves like a carrier that releases its metals' cargo in the lung environment, mimicking the phenomenon that explains the toxicity of nanoparticles.
Hence, the toxicity paradigm of a non biodurable fiber like chrysotile should also take into account the release of toxic metals in the intracellular/extracellular medium during the rapid dissolution process.

[1] Gualtieri (2018). *Sci. Rep*.**8**, 7071 [2] Ballirano (2017), *Mineral Fibres: Crystal Chemistry, Chemical-physical Properties, Biological Interaction and Toxicity. European Mineralogical Union*, 17–64. [3] Studer (2010). *Toxicol. Lett*. **197,** 169–174.