Characterization and toxicity of the metastable product of chrysotile asbestos dissolution

A.F. GUALTIERI[1*], G. LUSVARDI[1], A. PEDONE[1], D. DI GIUSEPPE[1], A. ZOBOLI[1], A. MUCCI[1], A. ZAMBON[1], M. FILAFERRO[2], G. VITALE[2], S. GENEDANI[2], M. TOMATIS[3], F. TURCI[3], L. PASQUALI[4] AND M. LASSINANTTI GUALTIERI[4]

[1] University of Modena and Reggio Emilia, Modena, Italy *correspondance: (alessandro.gualtieri@unimore.it); (gigliola.lusvardi@unimore.it);(alfonso.pedone@unimore.it); (ddigiuse@unimore.it); (176695@studenti.unimore.it); (adele.mucci@unimore.it); (alfonso.zambon@unimore.it)

[2] Department of Biomedical, Metabolic and Neuro-Sciences, University of Modena and Reggio Emilia, Modena, Italy. (monica.filaferro@unimore.it); (giovanni.vitale@unimore.it); (susanna.genedani@unimore.it)

[3] University of Torino, "G. Scansetti" Interdepartmental Centre for Studies on Asbestos and Other Toxic Particulates, Torino, Italy. (m.tomatis@unito.it); (francesco.turci@unito.it)

[4] Department of Engineering "Enzo Ferrari", University of Modena and Reggio Emilia, Modena, Italy. (luca.pasquali@unimore.it); (magdalena.gualtieri@unimore.it)

Chrysotile is the most widespread and used representative of asbestos. Although the carcinogenicity of chrysotile is widely proven [1], doubts about its toxicity persist [2]. In fact, its low biopersistence motivates the assumption that chrysotile is less toxic than amphibole asbestos. If breathed, chrysotile is easily dissolved by the acid environment of lung and transformed into a amorphous silica structure (ASChr) that can be easily cleared [3]. However, little is known about the toxicity of ASChr. In this work, for the first time, the structural, chemical-physical charcterisation of the ASChr, and its *in vitro* toxicity assessment have been performed. The main results show that the ASChr is composed of pure silica, preserves the fibrous habit of chrysotile, has a high specific surface area and maintains the production capacity of the ROS. The results also show that ASChr induced cellular damage, mainly through physical interactions. Based on our previous work and these new outcomes, it is possible to suggest a new model of chrysotile toxicity.

[1] IARC (2012) *IARC Monographs on the Evaluation Carcinogic Risks to Humans* **100C**, 219-309. [2] Carbone *et al.* (2007) *Nat. Rev. Cancer.* **7**, 147–154. [3] Gualtieri (2017) *EMU Notes in Mineralogy* **18**, pp. 556.