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Editorial

Editorial for Special Issue "Mineral Fibres"

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In the past 30 years, there has been a growing concern regarding the health risks of exposure to asbestos-containing materials (ACMs) and naturally occurring asbestos (NOA). Nowadays, harmful asbestos minerals that are regulated by law (in Europe and in several countries worldwide) include fibrous forms of the minerals chrysotile, crocidolite, amosite, tremolite, actinolite and anthophyllite. Asbestos has been classified as a Group 1 carcinogenic material by the International Agency for Research on Cancer. Therefore, many countries have banned its production and use [1]. In the past, more than 3000 types of asbestos-containing materials (ACMs) were used for making a wide variety of products for cinemas, schools, hospitals and army equipment, as well as in many industrial applications [1], because of their thermal insulation properties. However, the mining and use of tremolite asbestos, actinolite asbestos and anthophyllite asbestos was reduced compared to more commercially available types of asbestos such as chrysotile, crocidolite and amosite. Commercial asbestos fibres remain a serious problem both in previous installation in manufactured goods and in those countries where asbestos is still used. In the countries that banned the use of asbestos minerals and where remediation policies are encouraged, many studies and patents have dealt with the possible disposal and re-use of ACMs. The proposed inertization/recycling methods include thermal treatment, mechanical treatments, chemical, biological and biochemical treatments [2,3]. The preference for recycling compared to landfill disposal is specified in the European Directive [4], since recycling is the best solution, as it reduces environmental impact and the consumption of primary raw materials.

Although cases of disease due to exposure to ACMs may be decreasing in many countries of the world, there are newly recognized sources that pose a serious public health problem. These are unanimously called "naturally occurring asbestos" (NOA) [5], a term used to describe natural sources that trigger risk for a population due to weathering or human activities that produce dust consisting of fibrous minerals that may or may not fit the regulatory definitions of asbestos. In this regard, it is worth mentioning that non-regulated fibres (asbestiform) such as erionite, ferrierite and fluoro-edenite, are considered to be positive carcinogenic minerals sometimes more dangerous than the six regulated asbestos fibres [6–8]. Indeed, the US National Institute for Occupational Safety and Health (NIOSH) has recently proposed to extend the definition of asbestos to all of the elongated mineral particles (EMP). In many geological formations and outcrops, asbestos and EMP usually occur together [9] and these minerals must be discriminated correctly from a morphological point of view. In this regard, NIOSH highlights the difficulty in ascertaining the source of exposure in the case of mixed exposures for some mining operations.

NOA detection and quantification actions are important for providing the administrative agencies useful knowledge in order to carry out protocols for exposure control during construction such as highways, civil constructions and retaining walls. Many communities worldwide are potentially exposed to NOA, e.g., [10–18], and consciousness is increasing. In fact, health effects caused by NOA exposure continue to be of great public interest since the increasing risk of health problems for people who live close to NOA deposits worldwide has been widely demonstrated. In the last few years, excessive incidences of lung cancer and malignant mesothelioma have been reported as a consequence of the presence of NOA in Italy, Turkey, Greece, Corsica, New Caledonia, USA and China [19]. A crucial theme of interest related to environmental pollution is the enhanced mobilization of asbestos or asbestiform minerals affecting soils and rocks, due to human activities (e.g., road construction, excavation, mining) in comparison with natural weathering processes. Moreover, when natural causes or anthropic factors affect rocks which host asbestos, some naturally occurring harmful elements (e.g., Cr, Ni, Co, V) may be disseminated in the environment, resulting in the contamination of soil, water and air.

In summary, this Special Issue entitled "Mineral Fibers" depicts the state of the art about NOA as a source of possible environmental risks for populations, due to the adverse health effects associated with exposure. Case studies from various geological contexts are presented together with contributions presenting novel and classical approaches for asbestos inertization and recycling, together with possible solutions for reducing asbestos exposure.

Conflicts of Interest: The authors declare no conflict of interest.

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