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COMPARATIVE ANALYSIS OF THE THERMAL DECOMPOSITION PROCESS OF ASBESTOS WASTES FROM DIFFERENT REGIONS

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Abstract – Asbestos minerals were one of the most popular and cheapest raw materials used in the construction industry in the past. They were used primarily in the form of cement-asbestos composite material. Nowadays, we know that asbestos possesses carcinogenic properties. Due to this fact, asbestos was banned in many countries, especially in EU countries. All asbestos-containing materials are considered dangerous wastes and stored in special landfills, which causes significant environmental pollution. One of the proposed methods to solve this problem, may be thermal treatment during which the dangerous asbestos structure can be destroyed. Several asbestos-containing wastes from different countries were examined and compared. These asbestos-containing materials were characterised by chemical analysis (XRF) connected with mineralogical phase analysis by X-ray diffraction (XRD). The thermal decomposition of samples was studied by differential thermal analysis (DTA) and thermogravimetric measurements (TG/DTG). The material's behaviour at high temperatures was also studied using a high-temperature microscope. Moreover, computer simulations connected with the formation of the liquid phase were also carried out by specialised engineering software. In this stage, based on data presented in available literature related to chemical composition, the behaviour of asbestos waste from different countries was also analysed and compared. The studies have shown a significant difference in the behaviour of the tested cement-asbestos materials from different countries under high-temperature conditions. This may affect the prospects for reusing neutralised asbestos waste, especially in the context of the main mineral composition of thermally treated cementasbestos wastes. This fact implies possible directions for the economic management of such waste.

Keywords – *Asbestos waste; cement-asbestos materials; FactSage calculation; mineralogical composition; thermal treatment*

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