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Mechanochemistry in extractive metallurgy, materials science and medicine

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In this lecture the overall view on activities in mechanochemistry performed under umbrella of Slovak Academy of Sciences will be presented. Selected results from science and technology of extractive metallurgy, materials science and medicine will be illustrated. The golden thread in these activities is mechanochemical treatment using high-energy mills. Knowledge which we obtained from treatment of natural minerals to extract metals (I) and application of natural minerals for cancer treatment (II) was later broadened for preparation of synthetic minerals as energy materials (III). As examples the following can be mentioned:

(I) Elaboration of mechanochemical technology (MELT) for treatment of polymetallic (Cu,Sb, Au,Ag) ores

(II) *In vitro* and *in vivo* testing of mechanically activated arsenic ores for treatment of various cancer cell lines

(III) Application of mechanochemically synthesized copper-based synthetic minerals as prospective thermoelectrics

All the mentioned examples represent contribution to the common goal of mechanochemists - prepare new materials with the desired properties in a reproducible way under easy-operating, environmentally friendly and essentially waste-free conditions.