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Physics of microwave processing of geological materials and their interactions

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Apart their usages in telecommunication Microwaves have been used in minerals and materials processing. The materials in-outward heating mechanism is exploited to improve the reaction mechanism as well as the thermodynamics and process efficiency. This paper discusses findings obtained when soil materials were processed with microwaves either in a pre-treatment stage or in a final process stage. Sandstones and slates have been cracked using microwaves. This process was exploited in the artisanal mining of the above mentioned two commodities. Clayey soils have been processed with microwaves. Bacteria strains populations were reduced through microwave irradiation of geophagous clays. Sulphide and oxide ores have been Microwave treated. Partial and full roasting of sulphide ores were observed while oxidation-reduction of metals in their oxide minerals were studied. The physics of the interactions between the microwaves and the mineral phonons will be discussed through their macroscopic evolution and impact.

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