

Expression of interest in participating to the COST Action 530 Sustainable Materials Technology - Life Cycle Inventories for Environmental Conscious Manufacturing Processes"

1.1. Title

Utilization of New Life Cycle Environmental Friendly Non-metal Materials

1.2. Full name of proposer, address, telephone, fax and e-mail details

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1.3. Outline of activity

Increasing interest of the modern industry to cheaper raw materials, which could be used directly without additional or with small transformation (just cutting, forming etc.) makes us to study physical properties of industrial minerals. Traditionally their investigation includes chemical and mineral composition determination. For the modern industry much more interesting are their physico-mechanical properties. In the rare cases when they are defined, the destructive methods are used. Interpolation of these scarce data to huge rock massifs leads to significant mistakes. The physical properties of the rocks from the same petrographic type vary a lot. Some of these properties are well known in a qualitative sense, but modern industry needs their quantitative values, which are rather scarce in the research literature.

From the reasons counted above is obvious to see that human society could utilise these preferences just studying rocks physical properties and offering them to the industry.

Non-destructive methods are cheaper and wide applicable. They have significant advantages compare to the destructive methods that are: the investigated object do not change its properties and whole; could be conducted directly on the field; and the measurements take short time. They are used for the continues control and direct production characterization.

The aim of planned proposal is on the basis of widespread non-destructive rocks evaluation, to create rock physical properties data base, for the needs of: construction activity, industry, geological genetically reconstructions, natural and technogenic hazard assessments, nuclear and high toxic waste disposition, replacement of metal with non-metal natural materials, etc. and consequently to contribute for the global environment protection. Establishment of non-destructive rock physical properties data base will be completely new and original.

Review and analysis of raw materials consumption, lead us to the their global trends which define the necessity of non-destructive rock physical properties evaluation. This lead us to possibility, some of high energy consuming metal materials coming from

environmental high pollution processings to be replaced with environmental more friendly non-metal materials.

The metals production comes from high energy consuming processing, enormous emissions of many different pollutants, landscape damages and many others heavy environmental effects. Non-metals could be utilize directly, with minor processing - just cutting, forming, polishing etc. Replacing of metals with non-metal natural materials is possible in many cases.

1.4.Resources available in laboratory/institution of proposer

At the Sofia University St.Kl.Ohridski, Department of Mineralogy, Petrology & Economic Geology, Petrophysical lab there are different instruments and large experience in rock physical properties non-destructive determination. Our experience of more than 20 years in rocks non-destructive investigation is significant. It is important because they are heterogeneous media, very difficult for studding, with just approximately known formation conditions. Thousands of rock samples are physically investigated such as follows: volcanic (tuffs, tuff's sandstones, tuffobreccias, volcanic breccia, riolites, latites, latite breccias, andesites, andesitobasalts, dolerites, basalts, trachybasalts) and plutonic (monzonites, syenites, gabbros, gabbro-porphyrysts, monzogabbros), sediments (sandstones, limestones), metamorphic (amphibolites, marbles, gneisses, skarns) and many others. We work in close collaboration with Institute of Mechanics of Bulgarian Academy of Science – leading research national institution.

1.5.Skills or expertise sought from other partners

We need to collaborate with researchers in the field of Material sciences and especially with engineers, constructors, products designing etc. from industry to discover their needs and to offer new environmental friendly natural materials. We also need to collaborate with colleagues high experienced in attracting funding for new research and business.

1.6.Other