



Archaeomineralogy in Bulgaria: development of branches and priorities

Археоминералогията в България: развитие на направления и приоритети

Ruslan I. Kostov

Руслан И. Костов

University of Mining and Geology “St. Ivan Rilski”, 1700 Sofia; E-mail: rikostov@yahoo.com

Keywords: archaeomineralogy, archaeogemmology, petroarchaeology, Bulgaria.

Archaeomineralogy (archaeological mineralogy; mineralogical archaeology) is an important interdisciplinary science related to the study of archaeological and historical objects of a natural mineral or rock composition by the application of mineralogical, geochemical and petrographical methods (Kostov, 2007; Rapp, 2009). Of interest are also the sources of the stone artifacts (including in the broad sense the mineralogical, technological, economic and cultural approach).

In certain cases archaeomineralogy is linked also to gemmology as a science for the study of natural and artificial raw materials which have been used for some sort of jewellery or decorative purposes since the dawn of humankind to modern times (gemmological materials – precious mineral species and aggregates; decorative rocks; mineral bioobjects; natural glasses; pottery; artificial materials with or without a natural analogue; noble and other metals and alloys; imitations) including the methods and techniques for their manufacture. Industrial minerals (salt, clays, graphite, mineral pigments, abrasives, etc.) played also an important role in the development of different civilizations and are also of interest for such an interdisciplinary study. The same broad spectrum of modern analytical methods in archaeomineralogy (for determining the structure, chemical composition and physical properties) is used in archaeogemmology (furthermore, appearance, mode and perfection of processing, subsequent effects and change). In a lot of cases, because of the specificity of the samples (some of them are unique works of jewellery and museum samples under the protection of cultural heritage legislation) a number of different non-destroying the integrity of the artifact methods for their study are applied.

Archaeomineralogy can be viewed as a important part of geoarchaeology which is a broader scientific field of application of all the different branches of Earth sciences to archaeological searching, prospecting and the study of stone monuments or single artifacts (archaeometry is another term for similar and

a much broader field of interdisciplinary studies in archaeology including analytical methods and dating – Kuleff, 2012).

The territory of the modern Republic of Bulgaria, as well as the Bulgarian lands in the past, in the broad historical range of the term, since ancient times have been the place inhabited by different tribes, peoples and cultures, which have left their mark in the material and spiritual framework of the respective period. In recent years two reviews are published on papers in geoarchaeology and archaeomineralogy (Kostov, 2016), as well as in archaeometry during the last decade (Zlateva, Kuleff, 2016). The number of interdisciplinary studies increases which points to a proper cooperation between geoscientists (including mineralogists) and archaeologists. According to the archaeological periodization artifacts or sites are can be linked to the Paleolithic, Neolithic, Chalcolithic, Bronze Age, Iron Age, Medieval period and Bulgarian Revival period.

Main scientific fields of study are:

a) Mineralogical archaeology (archaeomineralogy) with subdivisions related to the chemical classes of minerals: native elements, sulphides and related minerals, oxides and hydroxides, halides, silicates, phosphates, sulphates and carbonates, as well as other oxy-salts, organic minerals;

b) Gemmological archaeology (archaeogemmology) with two main subdivisions: a) gemstones – precious and decorative minerals and aggregates (see Strack, Kostov, 2010), biominerals (see Ivanova, Kuleff, 2009), natural glasses, modified and synthetic materials; b) gemmological technologies, glyptic art (see Dimitrova-Milčeva, 1980);

c) Petrographical archaeology (petroarchaeology) with main subdivisions: igneous rocks; sedimentary rocks; metamorphic and metasomatic rocks. The importance of megalithic and rock-cut sites must be also underlined both in cases unique for southeast Europe (Kostov, 2008; Ivanova, 2016);

d) Mineral pigments and the arts (on pottery and as other decorations: caves, rock shelters, frescos, paintings – see Tarassova et al., 2013);

e) Archaeometallurgy (ores and alloys; slags): copper, gold, silver, iron and other metals; bronze and other alloys. Stress must be made on the earliest gold treasures in the world (see Varna necropolis) with examples of standardization (Kostov, 2007, 2017). Ancient mining and methods of extraction of mineral raw materials are studied by mining sciences;

f) Archaeology and crystallography (applied symmetry): symmetry groups in the design and decoration of archaeological sites and in the morphology of artifacts; crystallographic forms as artifacts (Kostov, 2014, 2017);

g) Historical mineralogy; ancient and medieval treatises; etymology (linguistics; minerals, rocks and metals in toponymy); ethnominerology: mythology, folklore and legends;

h) Ecominerology (medicinal mineralogy; geo-medicine – in a historical perspective).

As priorities for Bulgaria from an archaeological point of view are considered some prehistoric Paleolithic (Kozarnika cave) and Neolithic to Chalcolithic sites (Karanovo, Kovachevo, Hotnitsa, Ohoden, Provadia-Solnitsata, Stara Zagora, Kableshevo), including the Varna Chalcolithic necropolis and the Durankulak site, megalithic and rock-cut sites (Chalcolithic and/or Iron Age, under discussion), Thracian Culture sites (Iron Age) and Ancient Bulgarians sites (Medieval Period).

As priorities from a mineralogical and gemmological point of view for the territory of Bulgaria are:

a) Archaeologically typomorphic important minerals with the enigma of their sources for some of them: nephrite (probably the first Neolithic nephrite culture in the world introduced as “Balkan nephrite culture”), quartz (carnelian – Neolithic artifacts, but also the first known 32-faceted Chalcolithic beads; quartz-bearing aggregates – jasper, agate), malachite, jadeite- and glaucophane-bearing artifacts, turquoise, gold, graphite, garnets, beryl (emerald), lazurite, gemmological natural glasses – obsidian, gemmological biomaterials – jet and amber, mineral pigments;

b) Specific and new techniques applied to different gemmological materials (including standardization and miniaturization of artifacts);

c) Archaeometallurgy: first copper mines for Europe (Stara Zagora); oldest and largest number of gold artifacts for mankind (Varna); gold mining sites (Eastern Rhodopes); gold and silver Thracian heritage;

d) Megalithic and rock-cut monuments of specific rock-forming mineral composition.

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