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Grinding in the old times: the synthesis of cinnabar through the glass of ancient recipes

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Cinnabar is the principal mineral contains mercury in the form of mercury sulphide (HgS); it is characterized by a bright red color and it was one of the most important reds in art. It is found fairly widely, but not abundantly [1]. Among all the sources dealing with cinnabar [2], there is a large variety that describes its synthesis, which often requires a first step of grinding the reagents, i.e., sulfur and mercury. This first step leads to the formation of metacinnabar (polymorphically-stable at high temperatures) [3]; upon heating, this polymorph can be converted into the red form, cinnabar.

Indeed, sulfur is not the only substance used to synthesis cinnabar: the alchemist Pseudo Democritus claimed that mercury can be solidified by adding either sulfur, or realgar, or orpiment, or antimonite [4]. We have tested this synthesis replacing sulfur with each ore mentioned in the recipe; we have proceeded with the two steps already above-mentioned: the grinding of the ore with mercury and then heating the so-obtained powder. The synthesis succeeded with all the three minerals, but the chemistry behind the reaction works differently from the well-known reaction between sulfur and mercury.

References

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