

Photothermal characterization of obsidian

**Martínez-García MM⁽¹⁾, Macias JD⁽¹⁾, Franco-Bacca AP⁽¹⁾, Cervantes-Alvarez F⁽¹⁾,
May-Crespo F⁽²⁾, Martínez-Torres PG⁽³⁾ and Alvarado-Gil JJ^{(1)*}**

(1) Department of Applied Physics, Cinvestav-Unidad Mérida, Carretera Antigua a Progreso, Km. 6, CP. 97310 Mérida, Yucatán, México

(2) CONACYT Research Fellow-El Colegio de Michoacán A.C. Cerro de Nahuatzen No. 85, Fracc.Jardines del Cerro Grande, La Piedad de Cavadas, Michoacán, 59370, México

(3) Institute of Physics and Mathematics, Universidad Michoacana de San Nicolás de Hidalgo, Edificio C-3, Ciudad Universitaria, CP. 58040 Morelia, Michoacán, México

*Corresponding author's email: juan.alvarado@cinvestav.mx

Obsidian is a volcanic glass formed when volcanic rhyolitic material is expelled, and formed when the igneous material with a low gas concentration and water content cools fast enough to avoid the crystalline phase, producing an isotropic glass [1,2]. This material is one of the most used through human history, due to the fact that it can form sharp edges, which are ideal for the fabrication of tools and other artifacts [2]. The study of the properties is a fundamental question in archeology and anthropology. Additionally, obsidian analysis is also relevant in the fabrication of synthetic glass, but the main importance is the hydrated form of it, where can be used in a variety of modern applications, such as insulation, remediation of oil spills and as filter, among others. To evaluate the composition and properties of obsidian glass, several techniques have been developed and applied [3,4]. In this work, the thermal properties of obsidian glass from center of Mexico are measured using photothermal techniques. Our studies are complemented by X-Ray diffraction, FTIR and Raman spectroscopy. Our results show that the thermal properties depend strongly on the origin of the material and are the basis for applications of the obsidian as a utilitarian and reinforcing material as well as for the modelling of the formation and evolution of this kind of volcanic glasses.

References

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