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The Gümüldür Fire Opal: Mode of Occurrence and Mineralogical Aspects

ZEKİYE KARACIK<sup>1</sup>, Ş. CAN GENÇ<sup>1</sup>, FAHRİ ESENLI<sup>1</sup> & GÜLTEKİN GÖLLER<sup>2</sup>

<sup>1</sup> İstanbul Technical University, Faculty of Mines, Department of Geological Engineering, TR-34469 İstanbul, Turkey (E-mail: zkaracik@itu.edu.tr)

<sup>2</sup> İstanbul Technical University, Faculty of Chemical and Metallurgical Engineering, Department of Metallurgical and Materials Engineering, Maslak, TR-34469 İstanbul, Turkey

 [Keywords](#)  
[Authors](#)



[earth@tubitak.gov.tr](mailto:earth@tubitak.gov.tr)

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**Abstract:** Five types of silica polymorphs have been identified in dacitic volcanics from the Gümüldür region of western Anatolia, Turkey. Two of them are micro-quartz and disordered cristobalite (opal-C) that occur within the groundmass of the dacitic volcanic rocks. The others are pore-filling opal nodules including mainly massy opal-CT (opal-CTM) and rarely lussatite (opal-CTL) and amorphous opal (opal-A). Red and orange opal nodules are very similar to the gemologically well-known fire opals. Results of structural, chemical and thermal studies of the Gümüldür opals reveal their origin and mode of occurrence. Opal-CTM has gel-like or nano-grain texture and opal-CTL has a fibrous, chalcedony-like texture while opal-C in the glassy groundmass of the rock shows a lepidospheric texture. Dissolved silicon was possibly precipitated directly from a Si-rich solution to form opal at lower temperatures and pressures. Our detailed mineralogical examinations show that the colours of the red and orange body coloured massy opals seem to be related to increasing iron concentration. The Gümüldür red and orange fire opals have an importance as gemstones. They could be cut as cabochon with medium dome as ovals rounds. The polished surfaces of the opals display a resinous to sub-vitreous luster, with fewer cracks and fractures than the well-known fire opals of western Turkey.

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