CHEMICAL CONTENT OF THE DIDIM AND KEMER METEORITES.

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Introduction: Until today, a total of 16 meteorites fell in Turkey, two of which are Didim and Kemer meteorites. Didim fell in 2007 in Aydin, and Kemer fell in 2009 in Kemer. Both events are observed falls. Didim is an H3-5 ordinary chondrite, it contains H5 clasts in a H3 host [1]. Opaque phases are also present in Didim, and were investigated previously [2]. There are multiple lithologies in the Didim meteorite, such as white, gray, and dark lithologies. Initial characterization indicates an homogeneous composition for olivine and pyroxene in the white lithology (Fa_{19-20}, Fs_{17-19}), however a variable composition in the darker lithology [1]. Kemer is an L4 ordinary chondrite with an homogeneous composition for olivine and pyroxene [3]. Thus far, there is no detailed information on the molecular composition of these meteorites. We studied multiple stones of the Didim and Kemer meteorites in order to obtain detailed chemical and molecular compositional information from various phases and lithologies. This information may help us constrain their parent body processes.

Samples: Multiple stones of Didim and Kemer meteorites were acquired from the main mass holders. Thin slabs of both meteorites were cut and separated using a saw and then they were prepared as polished thin sections for our microspectroscopic investigation. We also studied bulk and unpolished fragments of both meteorites using the same techniques to assess the sample preparation effects on the collected data.

Methods: Micro-Raman spectroscopy experiments were conducted at Science and Technology Application and Research Center of Canakkale Onsekiz Mart University. The setup consists of a commercial WiTec alpha300 R (WiTec GmbH) confocal Raman imaging system, equipped with a 532-nm Nd:YAG laser, spectrometer with a CCD camera and 50X objective (NA = 0.8). The laser power was between 0.2 and 2.4 mW. We collected two-dimensional chemical distribution maps and individual spectra from various phases present in the samples. Additionally, we collected X-ray fluorescence (XRF) spectra of Didim and Kemer at Department of Geology Engineering of Akdeniz University. Using a commercial Rigaku NEX CG (Rigaku GmbH) XRF system, we were able to obtain elemental composition of the studied samples.

Results: Raman spectra from multiple regions/lithologies have been collected from the surface of Didim as part of our initial study. These spectra indicate presence of magnetite (evident from Raman peaks at 160, 318, 517, and 660 cm^{-1}), olivine (evident from a doublet with peaks at 826 and 852 cm^{-1}), pyroxene (with major peaks at 677 and 1015 cm^{-1}), iron oxides such as hematite (prominent peaks at 224, 288, 405, 494, 613, and 660 cm^{-1}), sulfides such as violarite (with a strong peaks at 320 and a weak peak 376 cm^{-1}) and arzakite (with peaks at 215, 275, 384, and 576 cm^{-1}). Raman spectra of Kemer show that it contains olivine, pyroxene, magnetite, and sulfides as well. Our initial XRF analyses that consist of multi-element $K\alpha$ values indicate that Didim and Kemer appear to be consistent with the ordinary chondrite classification. More experiments are certainly needed to understand chemical constituents of Didim and Kemer.

References: [1] Weisberg, M. K. et al. (2008) The Meteoritical Bulletin, No. 94. *Meteoritics & Planetary Science,* 43, 1551-1584. [2] Komorowski et al. (2009) *Meteoritics & Planetary Science* 44,A112,5. [3] Garvie, L. A. J. (2002) The Meteoritical Bulletin, No. 99. *Meteoritics & Planetary Science,* 47, E1-E52.