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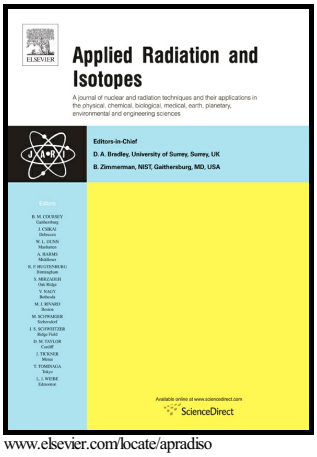

www.elsevier.com/locate/apradiso

PII: S0969-8043(16)30844-2
DOI: http://dx.doi.org/10.1016/j.apradiso.2017.05.002
Reference: ARI7881

To appear in: *Applied Radiation and Isotopes*

Received date: 17 October 2016
Revised date: 14 March 2017
Accepted date: 4 May 2017

Cite this article as: Lily Bossin, Nikolaos A. Kazakis, George Kitis and Nesto C. Tsirliganis, Thermoluminescence characteristics of a chondrite (Holbrook) and an aubrite achondrite (Norton County) meteorites, *Applied Radiation and Isotopes,* http://dx.doi.org/10.1016/j.apradiso.2017.05.002

Thermoluminescence characteristics of a chondrite (Holbrook) and an aubrite achondrite (Norton County) meteorites

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Abstract

The present study constitutes the first part of a meteorite project, currently in progress, towards the full and thorough dosimetric study (TL and OSL) of two different meteorites of recent fall, Norton County and Holbrook.

Both meteorites exhibit strong TL sensitivity, linear dose response and no saturation for doses up to 2 kGy. However, the two meteorites exhibited a very dissimilar TL glow curve and behaviour regarding sensitization and fading. Notably, the Norton County aubrite achondrite was found to exhibit a strong fading of the high-temperature peak (~300 ^{o}C), attributed to anomalous fading, whereas Holbrook did not seem to show signs of anomalous fading.

Since quantitative conclusions regarding the thermal and irradiation history of meteorites, require knowledge of the detailed peak structure of the glow curve and deeper understanding of the trapping mechanism, the glow curves, after irradiation in the range 10-2000 Gy, were deconvoluted using general order kinetics. The fitting parameters extracted point towards complex non-strictly first order mechanisms with a multitude of traps acting very differently.

All the above, combined with future OSL measurements, currently in progress, are expected to shed light on the nature of the involved traps in both phenomena (energy depth,