Thermoluminescence authentication and dating at University of Torino

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Abstract

In the last years, a laboratory for dating [1] and authentication [2] of archaeological finds and historical objects by means of thermoluminescence (TL) technique has been developed at the Physics Department of the University of Torino in collaboration with the Italian Institute for Nuclear Physics (INFN). The facility is part of laboratories within the INFN network CHNet.

In many cases, analysis are performed in partnership with TecnArt S.r.l. an academic spin-off of the University of Torino.

The laboratory and method [1]

Methodology: fine grain

PALEODOSE
Chemical preparation: Vieillevigne 2007 [3]
Irradiation: 90Sr/Y beta source
TL measurements: TL2000 Ipses reader

ANNUAL DOSE
Different approaches are used depending on the uncertainty required in the calculation of the age.
Irradiation (for k evaluation): 241Am in vacuum
Alpha counts: CALPH-Ipses
40K measurement: ICP-OES
Gamma ray spectroscopy: HPGe-ORTEC
Environmental dosimetry on site: TLD100
Correction for: supralinearity, anomalous fading, radon loss, porosity.

References


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1400 ± 70 AD
In agreement with the archaeological hypothesis.

Authentication

Pottery vessels and bowls from Hacilar

The collection was donated to the National Archaeological Museum of Florence in the sixties. It was attributed to the Hacilar settlement (Turkey) in the period 5250 BC – 5000 BC (based on stylistic considerations).

Only equivalent doses were measured (respectively 14 ± 2 Gy and 13,8 ± 1,3 Gy) and compared with results obtained by Aitken et al. 1971 [4].

TL signal is consistent with the historical period attributed

Dating

Monastery in Castelletto Cervo

The first document that mentions the existence of the monastery is dated back to 1083. However, archaeologists suggested that the upper forepart of the building may have been added between 1400 AD and 1500 AD.

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