USING HHXRF TO SCREEN RESCUED METEORITES FROM THE NATIONAL MUSEUM'S FIRE.

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On September 2nd, 2018 a devastating fire destroyed the Rio de Janeiro's National Museum entirely. Since the meteorite collection was distributed through three separated rooms, it was differently exposed to the fire. Located at the entrance hall, the Bendegó was only slightly covered by ashes, even the wood panel with its history plotted on paper remained intact. In the next room, all the meteorites at the exhibition "From Genesis to Apocalypse" were recovered among the ashes and some ceiling debris. These meteorites were then restored and are now in exhibition at the Rio de Janeiro's Planetarium. The main collection although, was housed at the technical reserve located at a badly affected room. It was recovered, many days after intense rains, under a mountain of twisted metal and fire debris from the collapsed upper floors and roof. It was not possible to identify some meteorites from many "meteorwrongs" sent by the public. Indeed apparently it was recovered more meteorites than were in the collection before. Posterior examinations select authentic meteorites from most fakes [1]. But also many real meteorites were damaged and are yet unidentified, due to the loss of many details, they don´t match anymore with the archives data.

Although the magnetic susceptibility be a very useful nondestructive measurement method for meteorite prior classification [2], this could not applicable with the rescued meteorites, as those magnetic signal has changed when the temperature reach beyond Curie point. So, an attempt for identification and classification of all the remained not identified samples is been performed using a Bruker Tracer 5i Handheld X-ray Fluorescence (HHXRF). First a series of calibration curves were performed using known meteorite bulk composition as standard, acquiring reasonable results that fitted into the Classification Diagram of Meteorites [3].

Initial results show that the relationship between Fe/Mn ratio and Ni content be a promisor as a fast meteorite classification method using a basic elemental HHXRF [4]. It fits very well especially with irons and achondrite meteorites. Other elements compositions ratios have also been tested. A refined classification using the EPMA, RAMAN and other equipment will be conduct only on selected samples of the collection.

Regarding to H chondrites a careful investigation of these results must be carried out, considering the presence of metal and silicates in the same sample. The fabricant modes use two different types of algorithms for quantification considering Compton or matrix effects.

We also realized that some meteorites are now, after three years, very weathered and need some specific not known care, friable meteorites like the Avanhandava, are disintegrating fast. Those meteorites give bad XRF results, probable due to porosity and weathering products as oxides and hidroxides.

References: [1] Monteiro F.A. et al. 2020. Boletim da Sociedade Astronômica Brasileira, 32(1):167-168. [2] Rochette P. et al. 2003. MAPS 38:251-268 [3] Krot A.N.et al .2013.Meteorites and Cosmochemical Processes: Treatise on Geochemistry1:1-63.[4] Zurfluh F. J. et al. 2011. X-Ray Spectrometry 40(6): 449-463.