Article Abstract

Title:	Prominent occurrence of iron oxides at KTB mass extinction: a review
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Abstract:	Out of the five major mass extinction, which have taken place in the history of life, Cretaceous–Tertiary boundary (KTB) mass extinction was the 2nd most disastrous, the most severe being that at Permian–Triassic boundary (PTB). On the basis of iridium anomaly at a number of KTB sites it has been established that the cause of extinction was impact with an extraterrestrial bollide. The iron oxide/oxyhydroxide and iron minerals such as illite, phyllosilicate, jarosite etc. present in the rock samples from KTB form a major part. One can study different phases of iron oxide/oxyhydroxide present in the KTB samples with the help of Mössbauer spectroscopy. The Mössbauer studies showed that at KTB sites nanophase goethite and/or hematite are present without coexistence of their counterpart bulk size iron oxide/oxyhydroxide minerals. The amount of nanophase iron oxides well correlate with iridium concentration showing that the nanophase iron minerals are genetically related to the events at KTB. Thus these nanophase iron compounds were formed in the geochemical conditions created by the impact, and not by slow weathering. The iron mineralogy at some other extinction sites is found to be very similar to that at KTB although there is no iridium anomaly. This raises an interesting suggestion that iron mineralogy i.e. presence of nano-sized oxide and oxhydroxide particles alone without the existence of bulk iron-oxide in sedimentary layers can be used as impact markers. Studies carried out on some off-KTB rock samples also showed iron mineral composition similar to that at KTB without having iridium anomaly. This opens up the new questions whether these layers are also result of some large meteoritic impact?
Keywords:	Mössbauer spectroscopy, KT boundary, nanophase iron, iron mineralogy.