Certificate of Authenticity

Northwest Africa 5000 ***Lunar Meteorite***

Section C4A, Slice 5 (EC)
Weight 36.1 grams
77 mm × 38 mm × 6 mm
Rating* **6+**
G2, **I**1, **M**2, **R**1, **SF**1, **WF**-1

Petrologic Classification: Feldspathic leucogabbroic breccia

General Description: This 11,528 gram fusion-crusted lunar meteorite was found in the southern Moroccan desert in July 2007. It is the second largest known lunar meteorite and the largest known meteorite from the lunar highlands. The rock is a complex breccia composed predominantly of genomict leucogabbroic to gabbroic clasts (consisting of anorthitic plagioclase, olivine, pigeonite, ilmenite and other accessory minerals) and related impact melt clasts within a fragmental to glassy, vesicular matrix. It provides evidence of multiple generations of impact brecciation in the ancient (probably > 4 billion year old) crust of the Moon, before it was ejected into an Earth-crossing orbit by an energetic impact (probably within the past several million years). Judging from the very low effects of terrestrial hydrous weathering and the preservation of glassy fusion crust and regmaglypts, the terrestrial residence age of this specimen must be relatively young.

Specific Description: Slice 5 is a generous endcut containing many gabbro and leucogabbro clasts (up to 9 mm in longest dimension) and no fewer than 26 visible grains metal (up to 1 mm). Some gabbro clasts are relatively mafic, with abundant yellow green olivine, pale clove brown pigeonite and black ilmenite; several have breccia mantles and others contain grains of metal. Small pure white feldspathic clasts, both black and gray impact melt clasts and rare olivine clasts are visible, all within a matrix containing regions of both medium gray, finely fragmental material and dark gray, glassy material with a few vesicles. The exterior surface has a thin desert patina.

*Key: **G** 1, 2, 3 = Gabbro clasts [size, % plagioclase, color index (= % olivine + pyroxene), metal]; **I** 0, 1 = Black to dark gray impact melt clasts [size, % relict clasts, variety]; **M** 1, 2, 3 = Metal [vol.%, # of visible grains, grain sizes]; **R** 0, 1 = Rare features [pure white clasts, gray clasts, mineral clasts, rare lithologies]; **SF** 1, 2 = Shock factor [breccia mantles on clasts, veins, vesicles]; **WF** 0, -1, -2 = Weathering factor [exterior staining, iron hydroxide around metal]. The numerical rating is the sum of characteristics in each category; a + designates above average visual presentation.

This certificate guarantees the authenticity of the listed meteorite.
Dated this 30th day of January 2008

Anthony J. Irving, Ph.D.