MONAZITE DATING OF LUNAR METEORITE NWA 4734. Albert Jambon[1] and Jean-Luc Devidal[2] 1 - University Pierre et Marie Curie-Paris 6, 4 place Jussieu 75252 Paris cedex 05, France2 - LMV, Université Blaise Pascal, 5 rue Kessler 63038 Clermont-Ferrand cedex, France

.

Introduction. According to their textural and geochemical similarity it was suggested previously that the lunar meteorite NWA 4734 could be launch paired with Antarctic Mare basalts (LAP 02205/224/226/436-03632-04841) themselves possibly paired with NWA 032/470 lunar meteorites despite their different textures (1-5). A possible clue about the pairing issue is evidently their age.

Method : After localization on a polished section of NWA 4734, four grains of monazite 2 - 4 µm were analyzed at 15 kV and 50 nA by electron microprobe with special attention to Th, U and Pb ; their measurements allow to calculate an age (6).

Results : U and Th are not constant among the grains, they vary from 0 to 0.16 and from 0.12 to 2.89 % respectively The Pb-Th correlation is in agreement with a negligible initial Pb content. Age deduced from empa is 3190 Ma (±190 2σ).

Discussion : An obvious question is the significance of this age. It can be either a shock age or a crystallization age. Indeed, NWA 4734 like LAP series samples exhibit significant shock features (partial maskelynitization of plagioclase, melt pockets …). The closure temperature of monazite for the U/Pb system is given at 950 °C (7). According to Montel et al (1996) the closure for Th/Pb should even be higher and the effect of metamictization of old monazites appears negligible for crystals of less than 50 micrometers.

NWA 032/470 is an impact melt with few phenocrysts and an abundant matrix finely crystallized with a quench texture. Its age of 2900 Ma (Ar/Ar, Fagan et al. 2002) is the youngest among Mare basalts and should reflect a crystallization event after a shock. Thus, it could be easily regarded as a shock age. SHRIMP U-Pb dating on apatites from LAP 02205 (2) yielded an age of 3000 Ma (±150 2σ). Rb/Sr and Sm/Nd ages are 3000 and 3200 Ma respectively (9 -10). As already mentioned, the youngest ages could be due to partial resetting upon impact.

References: [1] Jambon et al. -2009- [2] Anand et al. -2005- GCA, 70, 246-264. [3] Day et al. -2006- GCA, 70, 1581-1600. [4] Joy et al. -2006- MAPS, 41, 1003-1025. [5] Zeigler et al. -2005- MAPS, 40, 1073–1101. [6] Montel et al. -1996- Chem Geol, 131, 37-53. [7] Cherniak et al. -2004- GCA, 68, 829-840. [8] Fagan et al. -2002- MAPS, 37, 371-394. [9] Nyquist et al. -2005- LPSC 35, Abstract 1374. [10] Rankenburg K. et al. -2007- GCA, 71, 2120-2135..