**PRIMORDIAL ($^{40}$Ar/$^{36}$Ar) RATIO : NEW RESULTS FROM DYALPUR UREILITE,** S.V.S. Murty and S. Ghosh, PLANEX, Physical Research Laboratory, Ahmedabad 380009, India (murty@prl.res.in)

**Introduction**: The isotopic ratio ($^{40}$Ar/$^{36}$Ar) in the solar nebula is still not well constrained. Recent results from Genesis could also not provide $^{40}$Ar/$^{36}$Ar value of solar wind, due mainly to the overwhelming $^{40}$Ar blank [1]. A predominant part of $^{40}$Ar, even in the most gas rich sample is contributed by the radioactive decay of $^{40}$K (half life = 1.25 Ga). Earlier studies of Phase Q have only yielded an upper limit value of <0.2 for ($^{40}$Ar/$^{36}$Ar) [2] while the diamond separate from Dyalpur ureilite has yielded by far the lowest value of $(2.9\pm1.7)10^{-4}$ [3].

**Appropriate samples and procedures**: A sample which is rich in primordial trapped noble gases and negligible radiogenic and cosmogenic components will be ideal to measure the $^{40}$Ar/$^{36}$Ar ratio of the solar nebula. Both Phase Q and the C rich residues from ureilites satisfy these criteria. The matrix being C, there will be no cosmogenic production of Ar isotopes; and C rich acid residue being mostly free of metal and silicates, will be poor in K and hence radiogenic $^{40}$Ar will be low. In the present work, we have analysed acid resistant C rich residue of Dyalpur ureilite, on a multi-collector noble gas mass spectrometer, by step-wise combustion, having a low blank.

**Blank assessment**: We have employed combustion technique, to enable gas release at lower temperatures and hence achieve lower blank. Also, step wise combustion will release adsorbed terrestrial gases, as well as other components, before the release from diamond, the carrier phase of trapped gases in ureilites [4,5]. The sample is loaded in a gold foil. A series of blanks on empty gold foils of same weight as that used for sample have been combusted similar to sample run to assess the blank. While the expected value of ($^{40}$Ar/$^{36}$Ar) from the sample is << 1, the blank has ~300 for this ratio. Blanks are reproducible within ±20% in amounts and ±5% in isotopic composition, around terrestrial value. The blank contributions at $^{36}$Ar and $^{38}$Ar are ≤ 1%, while at $^{40}$Ar it is still large in most cases, making corrected value of ($^{40}$Ar/$^{36}$Ar) very critically dependant on the blank. In further efforts to improve blank in the main combustion steps (by releasing trapped Ar from gold foil) and to release most of the radiogenic and cosmogenic Ar from minor silicate/metal phases present in the acid residue, a 700$^{o}$C pyrolysis is carried out prior to combustion steps.

**Discussion and Summary**: The peak release of Ar, Kr and Xe, with lowest measured value of ($^{40}$Ar/$^{36}$Ar) occurred at 700$^{o}$C combustion step, along with peak $CO_2$ release, attesting to their release from diamond, the carrier of trapped noble gases in ureilites [4,5]. The value of $^{129}$Xe/$^{130}$Xe in the 700$^{o}$C step (6.361±0.014) is lower than the lowest value observed in Phase Q (6.436±0.012) [2], suggesting that trapping of gases by ureilites has happened earlier than by Phase Q, assuming that there is no elemental fractionation of I and Xe during trapping [6]. The present upper limit for ($^{40}$Ar/$^{36}$Ar) = $1.1\times10^{-4}$ in Dyalpur is marginally lower than the earlier value of $(2.9\pm1.7)10^{-4}$ [3].

**References:** [1] Meshik, A. et al. (2014) GCA **127**,326–347; [2] Busemann, H. et al. (2000) MAPS **35**, 949–973; [3] Göbel, R. et al. (1978) JGR **83**, 855–867; [4] Rai, V.K. et al. (2003a) GCA **67**, 4435-4456; [5] Rai, V.K. et al. (2003b) GCA **67**, 2213-2237; [6] Lewis, R.S., Anders, E. (1981) ApJ **247**, 1122–1124.