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Solar He & Ne in different groups of iron meteorites and relations to NC-CC reservoirs.

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Iron meteorites are classified based on siderophile element abundances as members of 14 geochemical groups, while isotope anomalies (e.g., of Mo) further distinguish noncarbonaceous (NC) and carbonaceous (CC) irons [1]. So far, only the iron meteorite Washington County (WC) is unequivocally found to host solar wind He and Ne within its metal, whereas other grouped irons also show intriguing signatures [2]. Oxygen isotopes provide an additional tool [3] to infer a common origin of the relevant groups. We report µm-sized chromite inclusions of WC that contain up to ~25 wt% MnO, representing a very rare manganochromite occurrence. Preliminary O-isotope data of WC chromites display huge $\delta^{18}O$ and $\delta^{17}O$ variations (i.e., -1.6 to 17.3‰ and -1.2 to 9.3‰, respectively) along a mass dependent fractionation line. Correlated with Mo-anomalies, also O-isotopes of iron meteorites trace their NC-CC heritage. This suggests that solar-type gases were preferentially incorporated into NC irons during their formation.

[1] Worsham, E.A. et al. (2019) EPSL 521, 103-112. [2] Vogt, M. et al. (2021) CommsEarth&Env 2, 92. [3] Clayton, R.N. & Mayeda, T.K. (1996) GCA 60, 1999-2017.

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