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Unifying chondrite petrologic subtypes

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The different decimal petrologic subtypes introduced for unequilibrated chondrites since the 1980's (e.g. [1-5]) are not intercalibrated or applicable for ungrouped samples. We [6] show that the existing OC, CO and R subtypes can be *a posteriori* unified, with only few reclassification, by defining their decimal part as $m = \text{Fa}_I / \text{Fa}_{II}$ the ratio of mean fayalite contents of type I and type II chondrules. We extend the logic to other (even reduced) chondrites. As to type 1-2 chondrites, we adopt the PSF (phyllosilicate fraction) of [5] and redefine the subtype as 3-PSF (rounded). The group-specific thin-section criteria of [3,4] can be embodied in the scheme, into which their subtypes may be readily converted. In principle, m and PSF provide separate metamorphic and aqueous alteration metrics, but at the level of precision chosen (one decimal place), a single petrologic subtype $\sim 3+m\text{-PSF}$ still suffices to capture the secondary classification of chondrites.

[1] Sears et al. (1980) Nature. 287:791-795. [2] Chizmadia et al. (2002). MAPS 37:1781-96. [3] Rubin et al. (2007). GCA 71:2361-82. [4] Harju et al. (2014). GCA 139:267-92. [5] Howard et al. (2015). GCA 149:206-22. [6] Jacquet & Doisneau (2024). MAPS 59:3150-80.

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Cite as: Jacquet, E., Doisneau, B. (2025) Unifying chondrite petrologic subtypes. Paneth Kolloquium, Nördlingen (Germany), abstract URL: <https://paneth.eu/PanethKolloquium/2025/0002.pdf> (abstract #0002).