

MEAN ATOMIC WEIGHT OF PULTUSK METEORITE AND H CHONDRITES.

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Introduction: Knowledge of mean atomic weight is important to characterize extraterrestrial minerals and rocks, planets, moons, and asteroids [1-3]. Pultusk meteorite is a brecciated H4-5 (S3) chondrite containing CM microxenoliths [4]. The meteorite fell on January 30, 1868 in Poland. The aim of the paper was to determine and analyze mean atomic weight of Pultusk meteorite and selected H chondrites. Literature data on mean bulk elemental and oxide composition of the meteorites have been used to calculate mean atomic weight [5,6].

Methods: To determine mean atomic weight A_{mean} values the following relationship was used

$$A_{mean} = \sum wi / \sum (wi/Ai), \quad (1)$$

where wi (wt%) is the mass fraction of i th element and i th oxide, Ai is the atomic weight of i th element and of i th oxide.

Results: It was established that average value of mean atomic weight of H chondrites falls $A_{mean} = 24.63$ (25.05), for H finds we have $A_{mean} = 23.59$ (24.80), and for Antarctic H chondrites $A_{mean} = 23.67$ (24.78), where values shown in parentheses are for meteorite composition without H₂O. Average values of A_{mean} for various petrologic types in H group: H3: 23.88 (24.84), H4: 24.56 (25.09), H5: 24.77 (25.06), H6: 24.79 (25.06). The range of A_{mean} values for H5 chondrites (falls) is 24.22-25.17 (24.74-25.47).

Individual H chondrites revealed A_{mean} values: Allegan: 25.16 (25.29), Ashmore: 24.62 (25.04), Chela: 24.22 (24.84), Dwaleni: 25.00 (25.17), Ehole: 24.97 (24.99), Ipiranga: 24.49 (24.99), Itapicuru-Mirim: 24.66 (25.47), Lost City: 25.11, Macau: 23.80 (24.97), Magombedze: 24.44 (24.85), Pribram: 24.63 (24.86), Pulsora: 25.17 (25.25), Sitathali: 24.94 (25.07), Uberaba: 24.27 (24.74), and Ucera: 24.80 (24.88).

Pultusk's $A_{mean} = 24.75$ (25.04) is close to average A_{mean} value for H5 chondrite falls: $A_{mean} = 24.78 \pm 0.32$ (25.05 \pm 0.20). The relationship discovered by the author between Fe/Si atomic ratio and mean atomic weight of the chondrite [2,3]

$$A_{mean} = (5.72 \pm 0.52) \cdot Fe/Si + (20.25 \pm 0.34). \quad (2)$$

predicts for Pultusk ($Fe/Si = 0.8017$) $A_{mean} = 24.84$, for H5 chondrites ($Fe/Si = 0.8027$) $A_{mean} = 24.84$, and for H chondrites falls ($Fe/Si = 0.8070$) $A_{mean} = 24.87$.

Conclusions: Mean atomic weight of Pultusk and H5 type chondrites is comparable with average A_{mean} value for H5 chondrites. Relationship between Fe/Si atomic ratio and A_{mean} of ordinary chondrites predicts precisely A_{mean} values.

References: [1] Szurgot M. 2015. Abstract #1536.pdf. 46th Lunar & Planetary Science Conference. [2] Szurgot M. 2015. *Acta Societatis Meteoriticae Polonorum* 6:107-128. [3] Szurgot M. 2015. Abstract #5008. 78th Annual Meeting of the Meteoritical Society. [4] Krzesińska A. and Fritz J. 2014. *Meteoritics & Planetary Science* 49:595-610. [5] Dyakonova M.I and Kharitonova V.Ya. 1961. *Meteoritika* 21:52-59. [6] Jarosewich E. 1990. *Meteoritics* 35:323-337.