MEAN ATOMIC WEIGHT OF CHONDRULES AND MATRICES IN SEMARKONA, ALLENDE AND SHARPS METEORITES. M. Szurgot, Lodz University of Technology, Center of Mathematics and Physics, Al. Politechniki 11, 90 924 Lodz, Poland (mszurgot@p.lodz.pl).

Introduction: Knowledge of mean atomic weight is important to characterize minerals and rocks, planets, moons, and asteroids [1-3]. The aim of the paper was to determine and analyze mean atomic weight of chondrules and matrices of three chondrites: Semarkona (LL 3.0), Allende (CV 3), and Sharps (H3.4 or H/L 3.4).

Results and discussion: Literature data on mean bulk elemental and oxide composition of meteorites, and composition of chondrules and matrices [4-6] have been used to calculate mean atomic weight (*Amean*) using the following formula:

$$Amean = \sum wi / \sum (wi/Ai), \qquad (1)$$

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

Table 1 and Fig. 1 present *Amean* values calculated for Semarkona, Allende, and Sharps meteorites, and for their chondrules and matrices. Chemical composition of meteorites, and their constituents used in calculations does not include H_2O.

Table 1. Mean atomic weight of chondrules, matrices, and Semarkona, Allende and Sharps meteorites.

Meteorite/ Class	*Amean* Chondrules	*Amean* Meteor-ite	*Amean* Matrix
Semarkona LL3.0	20.5-21.9	**23.2**	23.7-24.1
Allende CV3	21.5	**23.8**	24.5
Sharps H 3.4	20.7-21.2	**24.7**	25.2

Data reveal that *Amean's* values follow the inequality:

$$AChondrules < AMeteorite < AMatrix. \qquad (2)$$

Table 1 and Fig. 1 show that mean atomic weight of matrices is higher than chondrules and meteorites.

Data on bulk composition reveal that:

$$ASemarkona(23.2) < AAllende(23.8) < ASharps(24.7). \qquad (3)$$

Semarkona chondrules exhibit *Amean* values:

$$IB(20.5) < IA(21.1) < IIB(21.7) < IIA(21.9). \qquad (4)$$

FeO poor chondrules (type I) have lower *Amean* values than FeO rich (type II) chondrules (*AmeanIIA - AmeanIA* = 0.8, *AmeanIIB - AmeanIB* = 1.2), and olivine rich chondrules (subtype A) have higher *Amean* than pyroxene rich (subtype B) chondrules (*AmeanIIA - AmeanIIB* = 0.2, *AmeanIA - AmeanIB* = 0.6). Silicates of meteorites, matrices and chondrules exhibit much smaller *Amean* values (21.3-23.8) than Fe,Ni metal (56.2-57.8). Effect of Fe content on *Amean* is expressed by *Amean(Fe/Si)* dependence (Fig. 1).

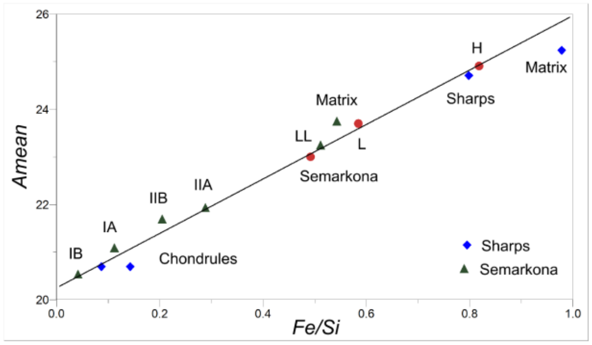

Fig. 1 Relationship between *Amean* and *Fe/Si* atomic ratio for Sharps, Semarkona and H, L, LL chondrites.

Fe/Si atomic ratio satisfactorily predicts *Amean* values by *Amean(Fe/Si)* dependence established for OC's [3] (Fig. 1), which is given by the equation:

$$Amean = 5.72 \cdot Fe/Si + 20.25. \qquad (5)$$

Amean value predicted by *Fe/Si* ratio for Semarkona whole rock is 23.2, and for Sharps whole rock is 24.2.

Conclusions: Mean atomic weights of matrices are higher than chondrules, and higher than meteorites. FeO poor chondrules have lower *Amean* values than FeO rich chondrules. *Amean(Fe/Si)* dependence predics precisely mean atomic weight of ordinary chondrites, chondrules, and matrices. *Amean* data indicate that Sharps is rather H than H/L chondrite.

References: [1] Szurgot M. (2016) *Acta Societ. Metheor. Polon., 7*, 133-143. [2] Szurgot M. (2016) *Meteoritics & Planet. Sci., 51 (S1 Suppl. 1)*, 6021.pdf. [3] Szurgot M. (2015) *Meteoritics & Planet. Sci., 50 (S1 Suppl. 1)*, 5008.pdf. [4] Jarosewich E. (1990) *Meteoritics 35*, 323-337. [5] Hutchison R., *Meteorites - a petrologic, chemical and isotopic synthesis* (2004), Cambridge. [6] Wlotzka F. (1983), in: *Chondrules and their origin's*, Lunar Planet. Inst., Houston, 296-318.