

**Mendeleevite-(Ce)**  $(\text{Cs}, \square)_6(\square, \text{Cs})_6(\square, \text{K})_6(\text{REE}, \text{Ca}, \square)_{30}(\text{Si}_{70}\text{O}_{175})(\text{H}_2\text{O}, \text{OH}, \text{F}, \square)_{35}$

**Crystal Data:** Cubic. *Point Group:*  $2/m\bar{3}$ . As well-formed cubic crystals to 30  $\mu\text{m}$ .

**Physical Properties:** *Cleavage:* None. *Fracture:* Conchoidal. *Tenacity:* Brittle.  
Hardness = 5-5.5 VHN = 613 (50 g load). D(meas.) = 3.12(2) D(calc.) = 3.07

**Optical Properties:** Transparent. *Color:* Colorless to clear tea color. *Streak:* White.  
*Luster:* Vitreous.  
*Optical Class:* Isotropic.  $n = 1.578(2)$

**Cell Data:** *Space Group:*  $Pm\bar{3}$ .  $a = 21.9148(4)$   $Z = 2$

**X-ray Powder Pattern:** Darai-Pioz alkaline massif, Tajikistan.  
10.95 (100), 3.097 (50), 3.46 (40), 3.068 (40), 2.190 (30)

|            |                                |       |                   |        |
|------------|--------------------------------|-------|-------------------|--------|
| Chemistry: |                                | (1)   |                   | (1)    |
|            | SiO <sub>2</sub>               | 43.52 | CaO               | 2.71   |
|            | Ce <sub>2</sub> O <sub>3</sub> | 19.24 | SrO               | 1.07   |
|            | La <sub>2</sub> O <sub>3</sub> | 9.87  | Cs <sub>2</sub> O | 8.64   |
|            | Nd <sub>2</sub> O <sub>3</sub> | 5.62  | K <sub>2</sub> O  | 1.08   |
|            | Pr <sub>2</sub> O <sub>3</sub> | 2.63  | F                 | 1.34   |
|            | Sm <sub>2</sub> O <sub>3</sub> | 0.58  | H <sub>2</sub> O  | [4.25] |
|            | Gd <sub>2</sub> O <sub>3</sub> | 0.38  | -O=F              | 0.56   |
|            |                                |       | Total             | 100.37 |

(1) Darai-Pioz alkaline massif, Tajikistan; average of 10 electron microprobe analyses, H<sub>2</sub>O and OH calculated from structure analysis, corresponding to

$\text{Cs}_{5.94}\text{K}_{2.22}[(\text{Ce}_{11.35}\text{La}_{5.86}\text{Nd}_{3.23}\text{Pr}_{1.54}\text{Sm}_{0.32}\text{Gd}_{0.20})_{\Sigma=22.50}(\text{Ca}_{4.68}\text{Sr}_{1.00})_{\Sigma=5.68}]_{\Sigma=28.18}\text{Si}_{70.12}\text{O}_{203.17}\text{H}_{45.67}\text{F}_{6.83}$ .

**Occurrence:** In a massif composed of a variety of granitic, alkaline granitic and syenitic pegmatites, various hydrothermal rocks (albitites, fenites) and carbonatites.

**Association:** Pectolite, and subordinate amounts of quartz, aegirine, fluorite, sogdianite, stillwellite-(Ce), reedmergnerite, leucosphenite, aegirine, polyolithionite, microcline, pyrochlore, turkestanite, hyalotecite, sokolovaite, kirchhoffite, pekovite, neptunite, zeravshanite.

**Distribution:** In glacial moraine, upper reaches of the Darai-Pioz River, near the junction of the Turkestan, Zeravshan, and Alai ridges, Darai-Pioz alkaline massif, Garm District, Tajikistan.

**Name:** Honors Dmitriy Ivanovich Mendeleev (1834-1907), the Russian chemist who among other accomplishments created the Periodic Table of Elements.

**Type Material:** A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia (3921/1).

**References:** (1) Pautov, L.A., A.A. Agakhanov, V.Yu. Karpenko, E.V. Sokolova, and F.C. Hawthorne (2013) Mendeleevite-(Ce),  $\text{Cs}_6(\text{REE}_{22}\text{Ca}_6)(\text{Si}_{70}\text{O}_{175})(\text{OH}, \text{F})_{14}(\text{H}_2\text{O})_{21}$ , a new mineral from the Darai-Pioz massif, Tajikistan. *Doklady Akademii Nauk*, 452(4), 441-444 (in Russian). English translation: *Doklady Earth Sciences*, 452(2) 1023-1026. (2) Sokolova, E., F.C. Hawthorne, L.A. Pautov, A.A. Agakhanov, and V.Yu. Karpenko (2011) The crystal structure and crystal chemistry of mendeleevite-(Ce),  $(\text{Cs}, \square)_6(\square, \text{Cs})_6(\square, \text{K})_6(\text{REE}, \text{Ca}, \square)_{30}(\text{Si}_{70}\text{O}_{175})(\text{H}_2\text{O}, \text{OH}, \text{F}, \square)_{35}$ , a potential microporous material. *Mineralogical Magazine*, 75(5), 2583-2596. (3) (2014) *Amer. Mineral.*, 99, 871-872 (abs. refs. 1 and 2).