## Oxo-magnesio-hastingsite $NaCa_2(Mg_2Fe^{3+}_3)(Al_2Si_6)O_{22}O_2$

**Crystal Data**: Monoclinic. *Point Group*: 2/*m*. As smoothly rounded megacrysts to 12 cm.

**Physical Properties**: *Cleavage*: Perfect on {110}, intersecting at ~56º. *Fracture*: Uneven. *Tenacity*: Brittle. *Hardness* = ~ 6 D(meas.) = 3.19(2) D(calc.) = 3.219

**Optical Properties**: Transparent. *Color*: Brown. *Streak*: White. *Luster*: Vitreous. *Optical Class*: Biaxial (-). $\alpha$ = 1.706(2) $\beta$ = 1.715(2) $\gamma$ = 1.720(2) 2V(meas.) = n.d. 2V(calc.) = 73° *Orientation*: *Y* = *b*; *Z* ^ *c* = 8°. *Dispersion*: Weak, *r* > *v*. *Pleochroism:* Strong, *X* = light brown, *Y* = brown, *Z* = dark brown.

**Cell Data**: *Space Group*: *C*2/*m*. *a* = 9.8837(3) *b* = 18.0662(6) *c* = 5.3107(2) $\beta$ = 105.278(1)° Z = 2

**X-ray Powder Pattern**: Deeti volcanic cone, Gregory rift, northern Tanzania. 2.555 (100), 2.708 (97), 2.596 (75), 3.383 (62), 1.5211 (48), 1.5854 (39), 2.162 (36)

**Chemistry**:

| | (1) |
|---|---|
| $SiO_2$ | 41.89 |
| $TiO_2$ | 3.96 |
| $Al_2O_3$ | 10.75 |
| $Fe_2O_3$ | 9.33 |
| FeO | 6.09 |
| MnO | 0.08 |
| MgO | 14.79 |
| CaO | 11.76 |
| $Na_2O$ | 2.84 |
| $K_2O$ | 1.74 |
| $H_2O$ | 0.61 |
| Total | 99.67 |

(1) Deeti volcanic cone, Gregory rift, northern Tanzania; average of 17 electron microprobe analyses, $Fe^{2+}/Fe^{3+}$ from Mössbauer spectroscopy; corresponds to $(Na_{0.67}K_{0.33})_{\Sigma=1.00}(Ca_{1.87}Na_{0.14}Mn_{0.01})_{\Sigma=2.02}(Mg_{3.27}Fe^{3+}_{1.25}Ti_{0.44}Al_{0.08})_{\Sigma=5.04}(Al_{1.80}Si_{6.20}O_{22})(O_{1.40}OH_{0.60})_{\Sigma=2.00}$.

**Mineral Group**: Amphibole supergroup, oxo-amphibole group.

**Occurrence**: As reacted megacrysts in melilititic tuff derived from a silica-undersaturated alkaline magma.

**Association**: Diopside, phlogopite.

**Distribution**: From the Deeti volcanic cone in the Gregory rift, northern Tanzania.

**Name**: As the *oxygen*- and *magnesium*- dominant analogue of *hastingsite*.

**Type Material**: Mineralogical Museum, Department of Mineralogy, St. Petersburg State University, St. Petersburg, Russia (sample OL 22, catalog number 1/19465).

**References**: (1) Zaitsev, A.N., E.Yu. Avdontseva, S.N. Britvin, A. Demény, Z. Homonnay, T.E. Jeffries, J. Keller, V.G. Krivovichev, G. Markl, N.V. Platonova, O.I. Siidra, J. Spratt, and T. Vennemann (2013) Oxo-magnesio-hastingsite, $NaCa_2(Mg_2Fe^{3+}_3)(Al_2Si_6)O_{22}O_2$, a new anhydrous amphibole from the Deeti volcanic cone, Gregory rift, northern Tanzania. Mineral. Mag., 77(6), 2773-2792. (2) (2015) Amer. Mineral., 100, 2013 (abs. ref. 1).