

Abstract Submission

T3 - Minerals, systematics, gems, collections
New Minerals, Nomenclature, and Classification

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CRYSTAL CHEMISTRY OF BELGIAN ARDENNITES

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Abstract Content: Ardennite, ideally $\text{Mn}^{2+}_4(\text{Al,Mg})_6(\text{SiO}_4)_2(\text{Si}_3\text{O}_{10})[(\text{As,V})\text{O}_4](\text{OH})_6$, is a rare Mn-rich aluminium silicate containing arsenate and/or vanadate groups. The two mineral species, ardennite-(As) and ardennite-(V), are occurring in highly oxidized and manganiferous metasediments that were affected by low to high-grade metamorphism (1). Several substitution mechanisms, controlled by the P-T conditions and the mineral assemblages, occur on various crystallographic sites, explaining the complex chemical compositions of ardennite (1).

During last decades, investigations carried out in Mn-rich schists located in the Stavelot-Venn Massif (Belgian Ardennes) have made it possible to identified new ardennite occurrences in the region. Single-crystal X-ray diffraction measurements were performed on twelve new Belgian ardennites. Crystal structures were refined to $R1 = 2.16\text{-}5.66\%$, in the $Pm\bar{m}n$ space group, with $a = 5.798\text{-}5.830 \text{ \AA}$, $b = 18.467\text{-}18.554 \text{ \AA}$, $c = 8.688\text{-}8.714 \text{ \AA}$. The free refinement of the tetrahedral site occupancy, hosting the pentavalent cations (As^{5+} , V^{5+} , P^{5+}), gives electronic densities varying between 33 and 23 e^- , indicating a complete solid solution between ardennite-(As) and ardennite-(V). Furthermore, the bond-valence sums calculated from the bond length values allowed the identification of the OH groups in the ardennite structure. The knowledge of the cation distributions in these new occurrences, combined with chemical data, will help us to better assess the crystal chemistry and the complexity of the ardennite group.

References: 1. Pasero, M., Reinecke, T. & Fransolet, A.-M. (1994). Neues Jahrbuch für Mineralogie Abhandlungen, 166, 137-167.

Disclosure of Interest: None Declared