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EPMA CHARACTERIZATION OF STRÜVERITE FROM AMANG OF PENINSULAR MALAYSIA

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ABSTRACT

The heavy minerals from tin tailings or *amang* comprises a wealth of minerals which contain some the most sort after metals in industry, that includes tantalum and niobium, which are widely used in the computer and cellular phone industry because of their high reliability, high melting points and corrosion resistance characteristics. An extended investigation was carried out on the EPMA into the complex nature of strüverite, the source of tantalum (Ta) and niobium (Nb) in *amang*, in particular its complex mineralogy, chemistry and associated phases/minerals. EPMA data of strüverite show that it is a complex intergrowth of rutile (TiO_2), tantalite (Ta_2O_5) and columbite (Nb_2O_5) with only very few grains devoid of any inclusions or exsolved phases. EPMA analysis of three “pure” strüverite grains, devoid of intergrowths, gave consistent ratios of Ti (19.5773–29.0757 wt%), Nb (5.4450–7.9935 wt%), Ta (25.4301–33.4607 wt%) and Fe (6.8890–8.1144 wt%). They also contain significant amounts of Sn (0.7905–2.6210 wt%) and Th (3.2493–6.0318 wt%) but very low W (0.1056–0.4673 wt%) and Mn (0.0052–0.1229 wt%) and no Y. Other strüverite grains which have inclusions or exsolved phases or intergrowths, all show very variable contents of Ti, Nb, Ta, Fe, W, Mn, Th and Y. BSE images on the EPMA also picked up zoned strüverite crystals where great variations in compositions are clearly discernible in X-ray maps of these zoned

crystals. EPMA analysis of fusion discs of strüverite concentrates from *amang* also show quite variable contents for Ti (12.6090–54.3837 wt%), Nb (1.7099–13.1203 wt%), Ta (2.8768–7.4003 wt%), Fe (1.4287–15.6514 wt%), W (0–3.4844 wt%), Mn (0.0472–1.5066 wt%) and Th (0–29.7631 wt%). The presence of Th with or without Y in some strüverite grains could be a useful criteria for determining their source area. Knowledge of the complexity of strüverite is useful in configuring the correct recovery processes for Ta and Nb.