

**G.H. MOH: Complex tungsten deposits (geology, mineralogy, geochemistry and genesis)**

On the 14th July 1982, Prof. Dr. G.H. Moh, of the Mineralogical-Petrographic Institute, University of Heidelberg, West Germany, gave the talk entitled "Complex tungsten deposits (geology, mineralogy, geochemistry and genesis)" to a crowd of about 65 members gathered at the Conference Hall, Geological Survey Laboratories, Tiger Lane, Ipoh. Despite the vehicle breaking down at Bidor, repairs were completed in record time for Prof. Moh to arrive just 5 minutes past the time scheduled for his talk.

As a classic example of a complex tungsten deposit, Prof. Moh chose the Shizhuyuan Mine of the Dangpo ore field, Shizhu, Hunan Province, China. The deposit is classified as the tin-tungsten-molybdenum-bismuth type. Mineralization is found to be associated with Middle and Upper Devonian rocks, consisting essentially of limestones and minor sandstone and shale, which have been affected by two Mesozoic granites - an early and middle stage granite of similar texture and geochemistry and a late stage granite porphyry with feldspar phenocrysts in a fine-grained matrix. Normally W-Mo-Bi mineralization is found to occur between the first and second generation granites, Sn-Bi associated with the second generation granite whereas most of the sulphides and tin are related to the granite porphyry. W-Sn-Mo-Bi skarns occur near the granite contacts in association with greisens, while further away in the limestones, metasomatic Pb-Zn ore veins develop. To add to the complexity of the deposit, all ore types show transitions to each other coupled with several stages of metamorphism and mineralisation which have resulted in the total number of identified minerals already exceeding one hundred. They include various sulphides, sulphosalts, oxides, phosphates, sulphates, carbonates and a large number of silicates. The common silicates include diopside, vesuvianite, tremolite, garnet, wollastonite, sillimanite, andalusite and cordierite.

Tungsten in the complex skarn deposit is found as scheelite associated with calcite and molybdenite in greisens and as wolframite associated with molybdenite and bismuthinite in metamorphic areas. Nb and Ta contents in wolframite are variable depending on whether they originated from the granites, skarns or the marbles.

Tin generally occurs as cassiterite and stannite in marble in small veins with lepidolite, tourmaline, pyrrhotite and pyrite, in fine veins throughout the greisens, in skarns with replacement textures associated with sulphides with fairly high pyrite and pyrrhotite contents and with copper-bearing lead-zinc ores. Tin has yet to be extracted from the ores. So far liberation and separation has failed because the cassiterite, mostly associated with stannite, appears to be too extensively intergrown throughout the deposit and extremely fine-grained.

A lively discussion ensued after the talk and Prof. Moh ably answered various questions put forward by the enthusiastic audience. Mr. F. Chand of the Geological Survey Malaysia proposed a vote of thanks on behalf of the Society for Prof. Moh's interesting talk. The excellent organisation by GSM's Ipoh representative, Mr. P.C. Aw, and the good turnout augers well for holding more talks in Ipoh in future, so that GSM members in that region can also benefit from GSM's Technical Talks.

G.H. Teh

\*\*\*\*\*