NICKELIFEROUS OPAQUE MINERAL ASSEMBLAGES IN TEHUITZINGO SEPENTINITE (SOUTHERN MEXICO): AN ELECTRON MICROPROBE STUDY. Guillermina González-Mancera (1), Fernando Ortega-Gutiérrez (2), Joaquín Proenza (3). (1) Fac.de Química-UNAM, México City, México.(2) Instituto de Geología-UNAM, México City, México. (3) Fac. de Geologia-UB, Barcelona, España. Email: ggm@servidor.unam.mx

The studied samples were collected in the Xayacatlán Formation of the Tehuitzingo area, State of Puebla, with the Paleozoic Acatlán Complex. The ultramafic body (8x2 km) in this area was deformed several times during its tectonic history, and the original mantle peridotite was completely converted to serpentinite. The present mineralogical composition consists of antigorite, with minor chrysotile, lizardite, epidote, brucite, chlorite, quartz, stichtite, Fe-Ni sulfide, and Fe-Ni alloys. The spinels found are relict of primary accessory chromite and their alteration products ("ferritchromite and newly formed magnetite).

It has been demonstrated that certain Ni-S assemblages, including awaruite, heazlewoodite, pentlandite, and millerite, are commonly associated with serpentinization and steatization (talc-carbonate), reflecting strong variation in oxygen and sulfur fugacity [1]. This study describes the mineralogy of Ni sulfides associated with serpentinites in the Tehuitzingo ultramafic body, and attempts to explain the fO_2 conditions of its formation because previous work [2,3], has been conducted mainly on silicate chemistry and mineralogy, whilst little is known about opaque mineralogy and fO_2 conditions during serpentinization. The approximate equilibrium state for nickeliferous minerals were inferred through electron-probe microanalysis (EPMA) and scanning electron microscopy (SEM) from the low-sulfur assemblage pentlandite-heazlewwoodite-awarurite (Fig. 1), which represents a much lower fO_2 (Fig. 2) generating H_2 than the high-sulfur assemblages containing millerite formed during carbonatic alteration. Besides, the absence of pyrite confirms that the system did not reach high fO_2 nor fS_2. Textural petrographic observations demonstrate that the sulfides and arsenides discovered in the ultramafic body of Tehuitzingo were formed during serpentinization, and were not associated with its original magmatic stage.

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References

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Fig. 1 **Fig.2**

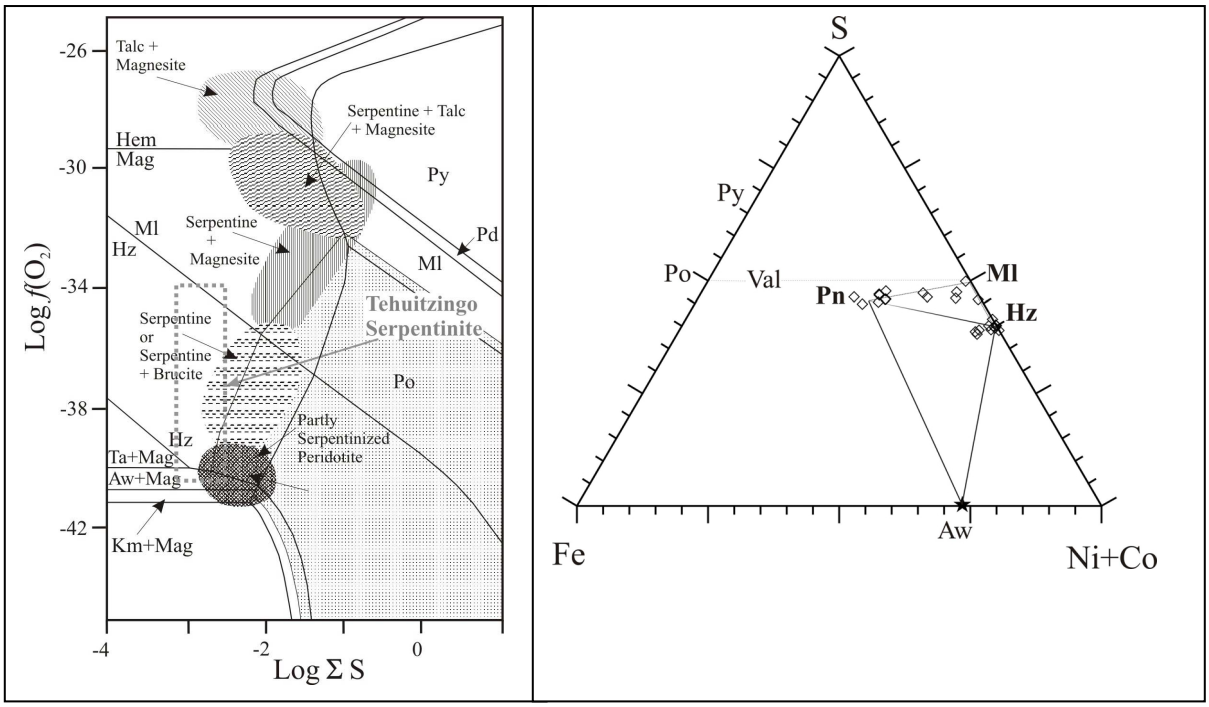

Fig. 1. Log fO_2-fS_2 diagram illustrating stabilities of minerals associated with serpentinites [4]. The rectangle area marked with the dashed is the stability field for assemblage minerals determinate in CUT.

Fig.2. Compositions of secondary sulfides from serpentinized peridotite en el Fe-Ni-S system. Heavy lines indicate dominate minerals in rocks from Tehuitzingo ultramafic body (CUT) in southern Mexico. The abbreviations are defined as aw, awaruite; hz, haezlewoodite; pn, pentlandite; mi, millerite; py, pyrite; po, pyrrhotite; val, indicates the S/metal ratio of vallerite.