

SHORT COMMUNICATION

DISCRETE PT MICROCRYSTALS FIRSTLY FOUND IN LTI BASALTIC LAVA FLOWS, PARANÁ IGNEOUS PROVINCE, STATE OF PARANÁ, BRAZIL

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1. INTRODUÇÃO

Platinum Group Elements (PGE) in basalt flows of the Paraná Igneous Province (the South American portion of the Paraná-Etendeka Igneous Province, one of the largest in the world) have been related in previous studies to a Norils'k-Talnakh mineralization model, despite inconsistencies such as the lack of EGP-collecting Ni-sulfides, low levels of S and rare olivine. On the other hand, Licht (2018), Gomes et al. (2018), Lindsay et al. (2021) showed the occurrence of relatively high levels of EGP (up to 18 ppb Pt and 9 ppb Pd) in tholeiitic basalts flows of the geochemical types 1-CN, 2 and 3 (Licht 2018), all belonging to magma-type Parapanema (Peate et al. 1992) and composing the magnetite and Ti-magnetite-rich Parapanema Formation (Licht & Arioli 2018). The magnetite-PGM association in PIP had already been proposed by Arioli (2008).

2. MATERIAL AND METHODS

Samples were selected for magnetic susceptibility (MS) measurements from a larger set of 1,561 drilling samples (chip-rock samples collected from surface up to 1600 m deep), which were previously analyzed for 62 major and minor oxides, trace and ultra-trace elements (see details in Licht 2018 and Gomes et al. 2018). Four samples with MS values $< 0,1 \times 10^{-3}$ SI and four with $> 0,1 \times 10^{-3}$ SI were chosen for further studies. After distilled water washing, the samples were dried at 35°C, and investigated with two scanning

electron microscopes (SEM): (a) JEOL JSM-6010LA operated at 20kV coupled to a Jeol dispersive x-ray energy spectrometer (EDS) EX-94410T1L11 and (b) TESCAN VEGA3 LMU with 3 nm resolution with magnifications of up to 300 kX, coupled to EDS (Oxford) with AZ Tech software (Advanced) with 80 mm² SDD type detector. The images were obtained with the In Touch Scape software v. 1.0.5.

3. RESULTS

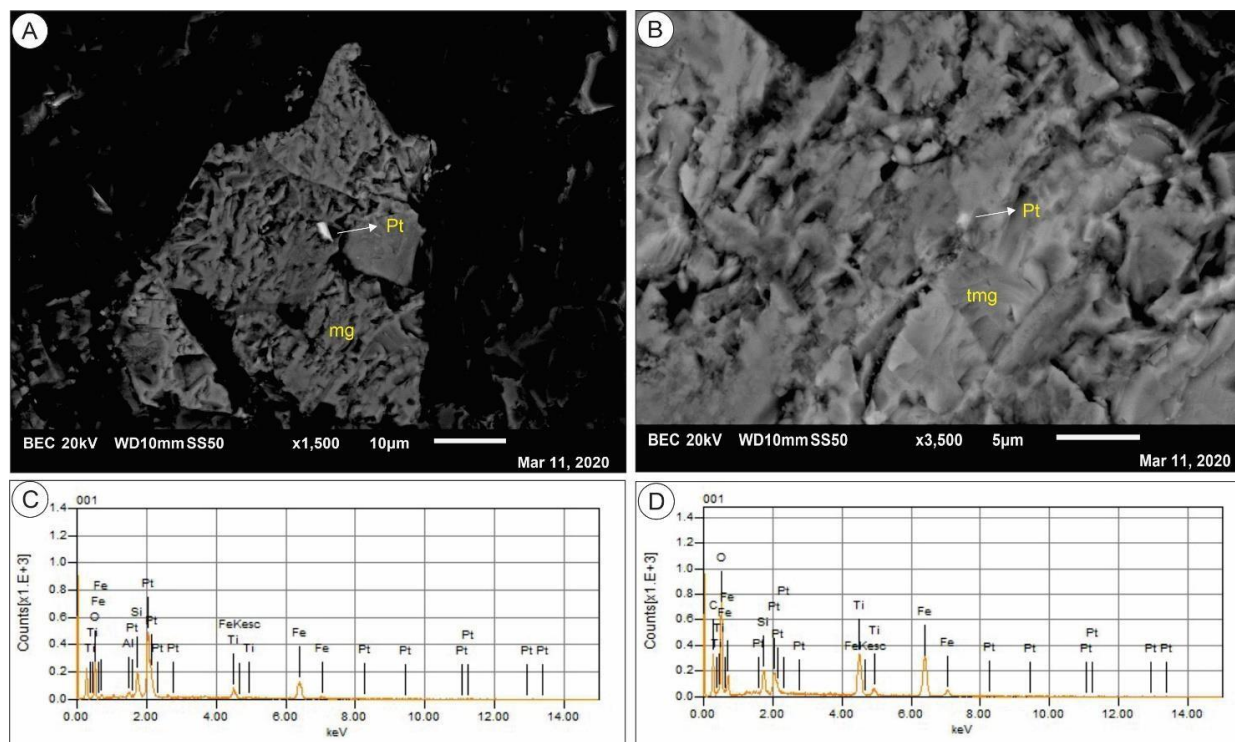
SEM imaging and the EDS spectrum allowed the identification of two Pt microcrystals in two Type 1 C-N LTI basalt samples: (a) an inclusion in a ca. $< 2\mu\text{m}$, prismatic magnetite crystal in a sample from the COP well at 224 m depth (Figures A and C); (b) a $< 2\mu\text{m}$ irregular grain included in a titanomagnetite crystal, in a sample from the CIA well at 600 m depth. (Figures B and D). It should be noted that no Pt crystals were observed in samples with $< 0,1 \times 10^{-3}$ SI.

4. - CONCLUSIONS

The metallogenetic control of PGM in the province's LTI flows would be exerted by iron; under conditions of maximum oxygen fugacity, favouring the concentration of siderophilic elements in ferromagnetic minerals (Arioli 2008), as indicated by the correlation between MS and iron contents. Pt and Pd also participate in this correlation with MS and Fe. The physicochemical differences, source heterogeneity and geological events involved in the genesis of these flows (Lindsay et al. 2021) would impact the

concentration of EGP and its association with ferromagnetic minerals. The unprecedented observations reported here; open an important exploratory

window into the PIP's LTi basalts, by combining geophysical (magnetic), geochemical and stratigraphic techniques.



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