13th International Platinum Symposium

Abstracts

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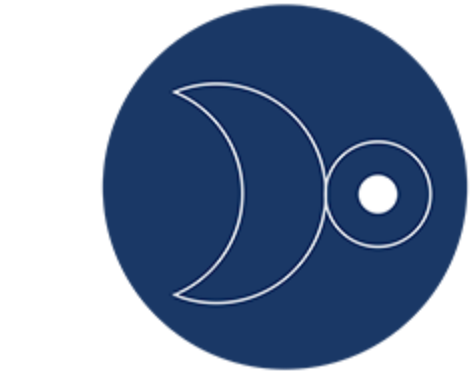

13th INTERNATIONAL PLATINUM SYMPOSIUM

Editors: Judith Kinnaird, Margaux Le Vaillant, Frederick Roelofse, Grant Cawthorn, Rais Latypov, Natalie Brand, Joseph Van Sheltema

This abstract volume includes presentations of the 13th International Platinum Symposium focusing on different aspects of geology, geochemistry, mineralogy and exploration of various platinum-group element (PGE) deposits and occurrences form all over the globe, with particular focus this year on the Bushveld Igneous Complex. A variety of presentations cover discoveries and evaluations of mineralised areas, descriptions of the host rocks, characterisation of different platinum-group element assemblages and ideas on the processes that form PGE mineralisation.

The materials of the volume are of broad interest for geologists, earth scientists and students.

^{190}Pt-^{4}He AGES OF PLATINUM METALS FROM PLACERS OF THE SIBERIAN PLATFORM AND THEIR POSSIBLE CONNECTION WITH LARGE IGENEOUS PROVINCES

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ABSTRACT. We applied the ^{190}Pt-^{4}He method to determine the ages of PGM from placers of the Siberian platform. These placers occupy large areas, but still do not have established indigenous sources. Herein we made an attempt to establish possible connections between the ages of platinum metals in these placers and the timing of large magmatic events, since highly productive platinum-bearing placers, which have various mineralogical and geochemical features, are usually associated with large igneous provinces.

In the east of the Siberian platform, since the beginning of the 20th century spread placers of shallow platinum are known, that occupy vast territories. Then, similar placers were found in the northeast of the Siberian platform in the rivers Anabar, and Olenek, and in other river basins during prospecting and exploration of diamonds.

In this work we determined the age of the native minerals of platinum from 4 placers from the r. Vilyui, r. Chara, r. Makylgan and r. Mayat (r. Anabar) (Fig.1).

Before Pt-He dating, all the samples were examined under an electron microscope for the absence of relatively large inclusions. Concentration of platinum in Fe-Pt alloys was measured by Camebax-Micro (IGDPM SB RAS). Concentration of radiogenic helium was measured on mass-spectrometer complex MSU-G-01-M (IPGG RAS) by the methodology described in Shukolykov et al[1]. Pt-He age was determined in single grains.

For ferroan platinum and isoferroplatinum from placers of the Vilyui river characterised by a high Rh content (3.6% on the average), 2 age values were obtained: samples with ancient datings define an isochron of 2015 ± 240 Ma, and one sample falls into the field of younger ages of platinum from placers of the Chara river (Fig. 2). The ferroan platinum from the Chara river placer contains moderate amounts of rhodium and iridium

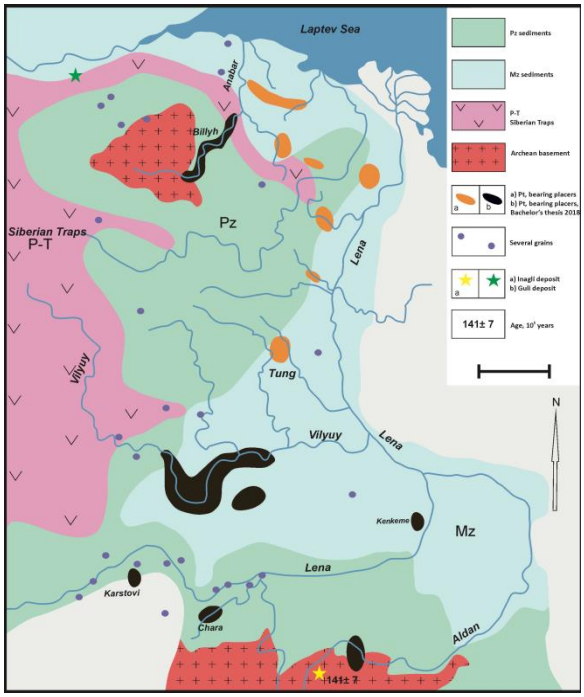

Fig.1 Schematic map of the locations of Pt-bearing placers of the Siberian platform.

impurities (an average of 1.8 and 1.1%, respectively) and in its composition corresponds to transitional differences from the high-grade "Vilyui" platinum to the high-iridium (Ir - 2.9%) "Inagli" isoferroplatinum. ^{190}Pt-^{4}He data on 4 samples of ferroan platinum from the placer of the Chara River constitute an isochron of 704 ±

141 Ma. The obtained ancient ages of platinum metals from the spread placer manifestations of the east of the Siberian platform once again confirm our earlier assumptions[e.g.2] on the existence of ancient buried highly productive

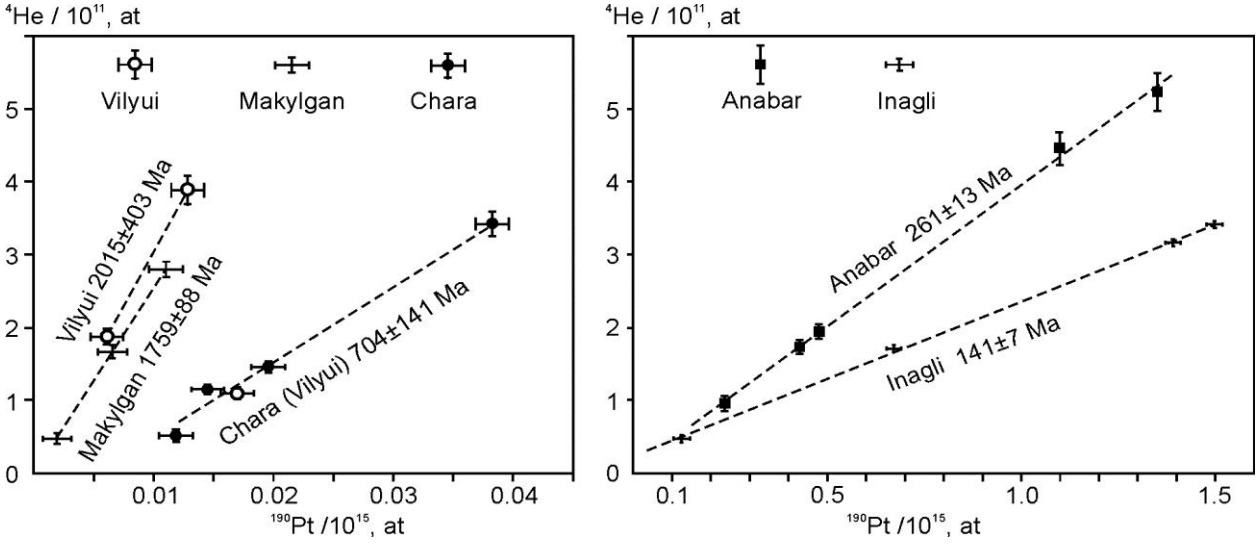

Fig. 2. ^{190}Pt-^{4}He "isochrons" for samples of Fe-Pt alloys from placers of the rivers: Vilyui, Chara (tributary of the Lena river), Mayat (tributary of the Anabar river), Makylgan (tributary of Aldan river) and Inagli.

platinum- bearing indigenous sources under the Paleozoic-Mesozoic cover. These unique "Vilyui" type placers have no analogues among other known platinum deposits.

We also studied PGM from complex gold-platinum-diamondiferous placers of the basin of the Anabar River (r. Mayat) with unidentified source rocks. In one grain of iridium-platinum, a well-crystallised silicate inclusion consisting of diopside, nepheline, phlogopite, amphibole, and titanomagnetite was found. The calculated composition of this inclusion corresponds to the rocks of the ijolite-melteigite series. The age of the grains of Fe-Pt alloys determined by the Pt-He method is 261 ± 13Ma (Fig. 2). Thus, the obtained data indicate the connection of PGMs from the placers of the basin of the Anabar River with P-T complexes of alkaline-ultramafic rocks. Another focus of this study was the PGM from the placer of the Makylgan River (the tributary of the Aldan River). Pt-He age of high-iridium (Ir-2.6%) ferroan platinum from this placer (1759 ± 88 Ma; Fig. 2) differs sharply from the Pt-He age of the iridium isoferroplatinum from the Inagli massif (141 ± 7 Ma)[3]. Thus, despite the proximity to the chemical composition of ferroan platinum of Makylgan with isoferroplatinum of Inagli, the PGMs of these two placers differ not only in the degree of ordering of the crystal lattices, but in the time of their formation. Thus, in the Central Aldan region, in addition to platinum placers of iridium-isoferroplatinum, associated with the Mesozoic ring intrusions of alkaline-ultramafic rocks ("Inagli" type), the existence of Paleoproterozoic placer-forming plutonometallic mineral formations is assumed. They are probably related to the formation on the Siberian platform of the Timpton large igneous province, dated to us from the dyke belts of the Anabar Shield, the Baikal Zone and the Aldan Shield in 1759-1752 Ma[4].

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