

# **Geochemical characterization of soil and Gold Grains from Artisanal Mining Pits around Osu Southwestern Nigeria.**

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Gold mineralization has been reported in different areas in the Ilesha Schist Belt of Nigeria but there is paucity of information on the mineralogical and micro-elemental characteristics of the gold grains in the area. The aim of this study is to determine the current state of gold prospectivity in the area and to determine characteristics of gold panned from the Osu area. 20 soil samples, heavy minerals and gold nuggets were collected from artisanal mining pits in the Osu area, southwestern Nigeria. Heavy minerals analysis was carried out using X-Ray Diffractometry (XRD) and Scanning Electron Microscopy (SEM) while the trace elemental composition of the soil samples were analysed using Inductively Coupled Plasma-Mass Spectrometry (ICP-MS). TIMA-X was used to determine the morphology, mineralogical and microchemical characteristics of the gold grains. XRD and SEM results revealed heavy minerals associated with the gold are ilmenite, baddeleyite, quartz, zircon and staurolite; and they are sub-rounded to sub-angular. Au concentration ranged from the pits ranged 0.1- 40.5ppb, with higher concentrations of 33.3-40.5ppb and 12.3ppb observed around 12-15m and 10-13m in the pits. TIMA X results revealed grain size of the Au nuggets varies from 10 $\mu$ m-<900 $\mu$ m. The grains are elongated, sub angular to rounded which implies they are close to their source. The Au grains are composed primarily of 88.3-100 % Au and 0-11.7% Ag with ilmenite-rutile, cassiterite, columbite, kaolinite, monazite, chamosite and iron oxide as accessory minerals. Mineral speciation results indicate the grains are fully liberated at 80% with high purity. Further gold exploration in soils around Osu area can target depths of 10-15m which is the depth associated with anomalous gold concentration in this study.