Petrological Study of Uranium-bearing Polymetallic Mineralisation in the Sediments of Badami Group of the Proterozoic Kaladgi Basin, Belgaum District, Karnataka. – Kusum Prakash, Atomic Minerals Directorate for Exploration and Research, Bangalore -560072. (E: kusumprakash.amd@gov.in)

Badami sediments, unconformably overlying the basement rocks of Chitradurga Group and granitoid in the south-western part of Kaladgi basin, form one of the potential targets for hosting uranium mineralization. Significant surface uranium mineralisation hosted in quartz arenite of the Badami Group of the Kaladgi Supergroup was located by AMD at Deshnur, Belgaum district Karnataka. Subsequently, follow-up sub-surface exploration has resulted in identifying encouraging uranium mineralization within quartz arenite and matrix supported lower conglomerate in Deshnur area and within matrix supported lower conglomerate at Suldhal area. The petrographic studies of the mineralized (grab and core) samples indicated presence of uranium and other polymetallic sulphide minerals along the fractures, in intergranular spaces and as stringers.

The uraniferous quartz arenite is mineralogically and texturally mature. It comprises more than 95% quartz with a few clasts of feldspar, quartzite and chert. The framework clasts are bound together by diagenetically overgrown quartz cement. The diagenetic overgrowth of quartz has reduced the porosity considerably. The radioactive horizon also bears evidence of deformation in the form of development of hairline to micro fractures, which have been subsequently filled by sulphides and uranium bearing minerals.

Whereas, the uraniferous conglomerate is matrix supported, dark grey in color and friable in nature. It is poor to moderately sorted and

immature. It contains granules and pebbles of primarily mono and polycrystalline quartz, microcline, orthoclase, perthite and plagioclase set in arkosic matrix.

Zircon, apatite, sphene, monazite and opaques of sulphides and uranium minerals occur as accessory minerals in both quartz arenite and matrix supported conglomerate. Pitchblende and coffinite are the major two primary uranium minerals identified in these sediments besides, secondary uranium minerals. A number of sulphide bearing minerals viz. pyrite, marcasite, galena, sphalerite, greenockite, bravoite, chalcopyrite, bornite chalcocite, energite, digenite, covellite besides cuprite (as oxide phase), malachite (copper carbonate hydroxide phase) and native copper (particularly in Suldhal area) have been identified both in radioactive arenite and matrix supported conglomerate. Paragenetically, pyrite, chalcopyrite, bornite and bravoite are the earliest formed sulphides, followed by galena, sphalerite and greenockite, in places chalcocite, energite digenite, covellite, native copper cuprite and malachite. Pitchblende and coffinite found to be replacing sulphides and native copper. The petromineralogical and ore microscopic studies at Deshnur and Suldhal area indicate that the mineralisation is hydrothermal and epigenetic in origin.

DOI: 10.1007/s12594-019-1337-z