

solutions. The paucity of magnetite in the coarse paligenetic charnockite and charnockite pegmatites supports this contention of sulphide formation from magnetite during paligenesis in a high grade granulite belt.

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K-Ar ages of Indian Kimberlites

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Kimberlites are ultramafic rocks, which during emplacement have incorporated a variety of mantle and crustal xenoliths and have undergone reaction with their own volatile constituents. In spite of their small volume among igneous rocks, these have been studied extensively in recent years because of their deep seated origin in the earth's mantle, and also because these are the only natural source of diamonds. Both in mineralogical and chemical composition, kimberlites show great variation; the presence of diamond is no more considered necessary for a rock to be termed as kimberlite (Dawson, 1971).

In India kimberlites are reported from Majhgawan area in M.P. and from Anantpur district in A.P. (Mathur and Singh, 1963; Rao and Phadtare, 1966). Mineralogically, the south Indian kimberlites resemble the 'hardebank' of South Africa, while the central Indian occurrences have been classified as 'altered micaceous'. Geological Survey of India have recently discovered rocks of kimberlitic affinity in a tract in the Jungel Valley in U.P. Diamonds have also been recovered from these occurrences.

This note presents new K-Ar age of a whole rock kimberlite from the Jungel Valley and discusses the implications in relation to other available ages.

A survey of the occurrences of kimberlites all the world over indicates certain common features—the most important both from the point of view of petrogenesis and prospecting being, their localisation in stable cratonic areas. Kimberlites appear to have been emplaced throughout geological time, the oldest of which is believed to be of Precambrian age at Premier, S. Africa (Allsopp *et al.*, 1967). Younger kimberlites of Eocene age are known to occur at Hearn (McGregor, 1970). But the most profuse kimberlite emplacement seems to have taken place in the Cretaceous (McGregor, *op. cit.*).

Radiometric ages of Indian kimberlites have been determined recently for the Majhgawan and Anantpur occurrences (Paul *et al.*, 1975). These kimberlites have been found to give K-Ar ages ranging from 840 to 1170 Ma and have been interpreted as minimum emplacement ages. This is significant in that all are of Precambrian age in contrast to most other kimberlites that were emplaced in the Mesozoic.

The result of the new K-Ar age determination from a sample of the Jungel Valley is given below. The age determination has been carried out at the Geochrono-

logy laboratory of the Geological Survey of India using a VG Micromass 600 mass spectrometer, operated under static conditions. ^{38}Ar was used a tracer. Argon extractions were carried out in an ultra high vacuum stainless steel line by heating the whole rock sample in a molybdenum crucible in resistance heating furnace and was purified in the standard way. Potassium was determined, in duplicate, using a Perkin Elmer atomic absorption spectro-photometer.

TABLE : K-Ar analytical data

Sample No.	Lab. No.	K* %	Radiogenic ^{40}Ar , nl/gm	% Atoms Ar	Age M.a.
5	A 517	0.025*	1.17	72.74	919 ± 21

Decay constants $\lambda_{\beta}=4.963 \cdot 10^{-10}\text{a}^{-1}$ $\lambda_{\epsilon}=0.581 \cdot 10^{-10}\text{a}^{-1}$

^{40}K abundance = 0.01167 atom %

* Analyst: N. R. Sengupta.

The sample is comparatively free from secondary alteration although olivine has been completely serpentinised. We are thus inclined to suggest that the K-Ar age is a minimum age. Good agreement of the present data with earlier age data from the neighbouring Majhgawan pipe precludes the possibility of presence of excess Argon. Furthermore, extending the arguments put forward for the K-Ar ages of the other Indian kimberlite occurrences, we believe that the new K-Ar age does not indicate any pre-emplacement event in the source region unlike those surmised for the Yakutian occurrences (Davidson, 1967). The near consistent clustering of the K-Ar ages of the Indian kimberlites (Paul *et al.*, 1975) and this study seems to imply that the petrogenetic evolution of the Indian kimberlites have been initiated by a deep seated event over a short span of time. This surmise is also corroborated by gravity (negative residual gravity anomaly closure of -0.4 m gals) and magnetic (E-W trending isoanomaly magnetic - V.F. patterns varying in values between 2000 - 3000 gammas) data obtained in the Jungel Valley, which suggest the occurrence of a deep seated fracture along the 15 km long east-west trending Jungel Valley. Incidentally this fracture is also parallel to the Narmada Son Lineament.

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