

Supplementary Materials

Table S1. Operating conditions for LA-ICP-MS.

ICP-MS		
Instrument:	Agilent 7700cx (Agilent Technology)	
Forward power:	1550W	
Gas flow rate	Cool	15 L/min
	Auxiliary	1.0 L/min
	Nebuliser	0.9–1.0 L/min
	Carrier He	0.80 L/min
Scanning mode:	Peak jump	
Analysis mode:	Time resolved analysis (TRA)	
Integration mode:	30sec/sample	
Laser Ablation system		
Instrument:	New Wave Research NWR213	
Laser:	Nd: YAG laser	
Wavelength:	213 μm	
Pulse energy:	>30 Jcm ⁻²	
Crater size:	100 μm	
Repetition rate:		
Sample cell:	100 × 100mm ² × 30mm (deep)	
Nebuliser gas flowrate:	0.97 L/min	
Plasma gas flow:	15 L/min	
Detector mode:	Pulse-counting/analogue-counting automatic switching mode	
Calculation software:	MassHunter	

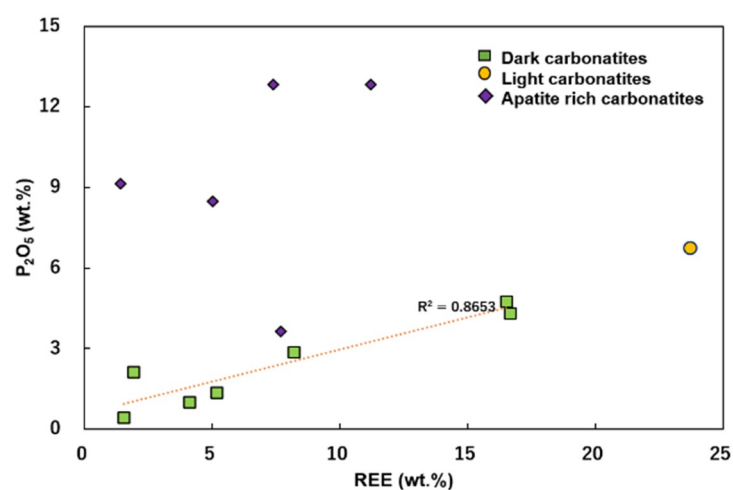


Figure S1. Correlation of P vs TREE concentrations in the light and dark carbonatites.

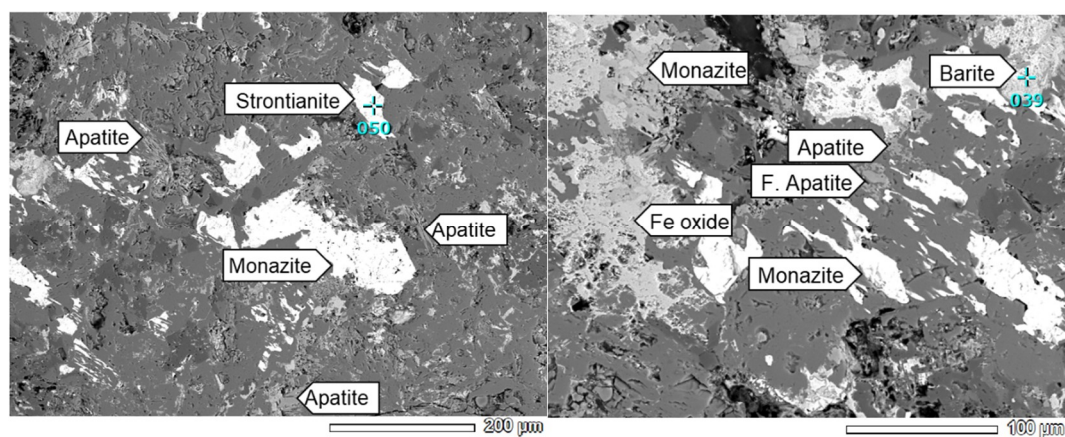


Figure S2. Apatite abundance in apatite-rich carbonatites.

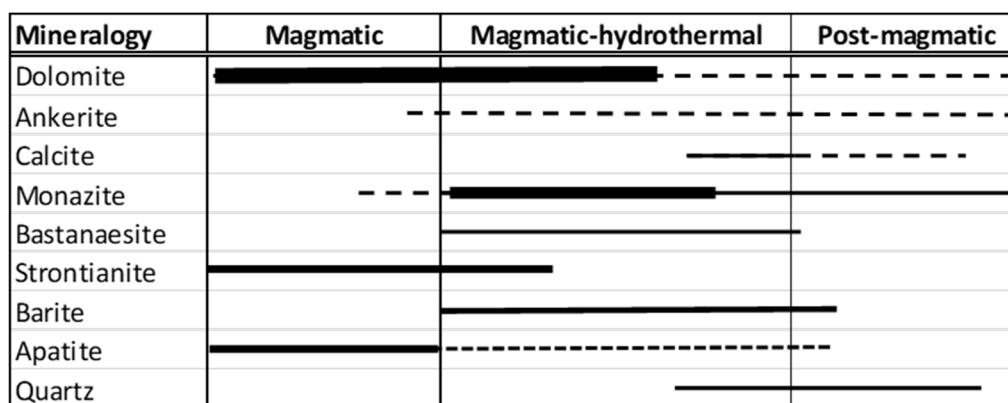


Figure S3. Paragenetic sequence of mineral occurrence in the Kangankunde carbonatite.

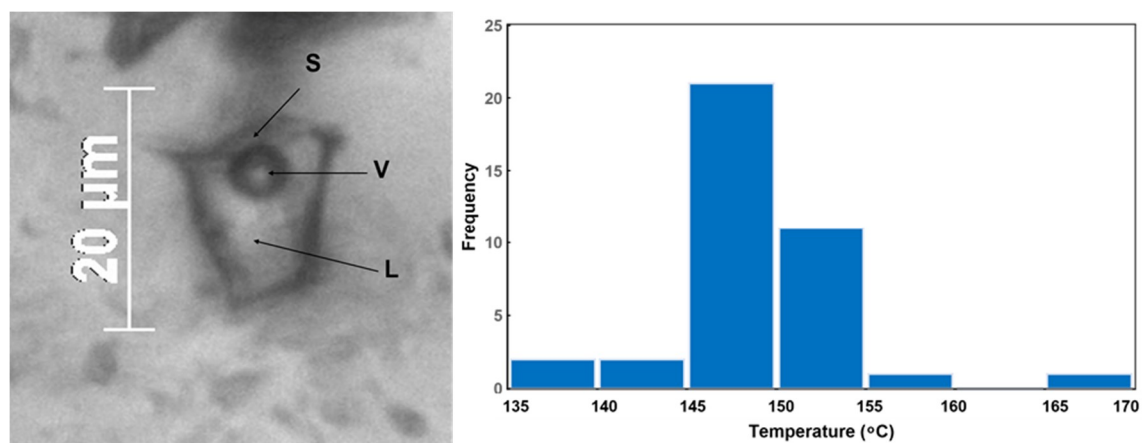


Figure S4. Fluid inclusion in dolomite and the homogenization temperature of most inclusions.