

Accepted Manuscript

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PII: S0024-4937(17)30296-7
DOI: doi:[10.1016/j.lithos.2017.08.018](https://doi.org/10.1016/j.lithos.2017.08.018)
Reference: LITHOS 4401

To appear in: *LITHOS*

Received date: 11 April 2017
Accepted date: 25 August 2017



Please cite this article as: Kargin, A.V., Sazonova, L.V., Nosova, A.A., Lebedeva, N.M., Tretyachenko, V.V., Abersteiner, A., Cr-rich clinopyroxene megacrysts from the Grib kimberlite, Arkhangelsk province, Russia: Relation to clinopyroxene–phlogopite xenoliths and evidence for mantle metasomatism by kimberlite melts, *LITHOS* (2017), doi:[10.1016/j.lithos.2017.08.018](https://doi.org/10.1016/j.lithos.2017.08.018)

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**Cr-rich clinopyroxene megacrysts from the Grib kimberlite, Arkhangelsk province, Russia:
relation to clinopyroxene–phlogopite xenoliths and evidence for mantle metasomatism by
kimberlite melts**

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Abstract

To provide new insights into the origin of megacrysts and metasomatism of the subcontinental lithospheric mantle (SCLM), we present a detailed petrographic and geochemical investigation of clinopyroxene-phlogopite xenoliths and clinopyroxene megacrysts from the Grib kimberlite (Arkhangelsk diamond province, Russia). Clinopyroxene megacrysts and clinopyroxene from clinopyroxene-phlogopite xenoliths have similar petrography, major and trace element compositions, and are therefore classified as Cr-rich megacrysts. Geothermobarometry suggests that Cr-rich clinopyroxenes originate from within the SCLM (3.6 – 4.7 GPa and 764 – 922°C).

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