Geodynamics Seminar

第377回ジオダイナミクスセミナー

Microtexture and formation mechanism of impact diamonds from the Popigai crater, Russia

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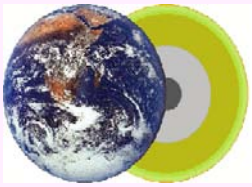
主催：愛媛大学地球深部ダイナミクス研究センター
日時：2/28（金）午後 4時30分～
場所：総合研究棟Ⅰ 4F 共通会議室



EHIME UNIVERSITY GRC GEODYNAMICS RESEARCH CENTER

Abstract

Large meteoritic impact occasionally produces an extensive amount of diamond on the surface of the Earth. Popigai crater located in the north central Siberia is a typical example of such diamond-forming shock events and has recently been brought back into the spotlight due to its vast estimated reserves of the impact diamonds. Popigai diamonds occur as inclusions in impact melt rocks, have irregular to tabular shapes of 0.5-2 mm size and yellow, gray or black colors. Here, we present the result of detailed microtextural observations of impact diamonds from the Popigai crater by TEM and discuss the formation mechanism and condition in comparison with those of synthetic diamonds obtained by high pressure and high temperature experiments. In total 10 diamond grains from the Popigai crater were studied. Micro-focus XRD analysis showed that transparent samples consist mostly of diamond and occasionally contain lonsdaleite, while black ones are a mixture of graphite, lonsdaleite and diamond, which are all in a coaxial relation as shown by 2D diffraction patterns collected in transmission geometry. TEM observation revealed that although all the samples commonly possess layered structures and preferred orientation (mostly along [111] of diamond), there are varieties in crystallite (grain) size (down to 10-20 nm) and degree of preferred orientation. Taking into account the similarity in texture and preferred orientation feature between the Popigai diamonds and synthetic diamond, the variation is likely derived from the small difference in crystallinity of the starting graphite sources and perhaps more significantly from the difference in shock temperature.

詳細は当センターホームページ： http://www.ehime-u.ac.jp/~grc/をご覧ください
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