

Coloration Analysis of Yellow Synthetic Diamonds

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Almost all of the high temperature-high pressure (HTHP) synthetic diamonds have yellow tone, which is discussed and solved in this thesis. The yellow synthetic diamond samples are tested with UV –visible light spectrophotometer, micro-infrared spectroscopy, cathode luminescence and other large equipments. We focus on high temperature and high pressure conditions changing, and the following conclusions are made :In the high temperature under vacuum pressure, diamond is not in the stable phase region, graphite can easily occur. Under experimental high temperature and pressure conditions (1500-1600 °C, 7.50GPa), the color of samples in this thesis have changed, the yellow tone has been obviously decreased, and the experiment is repeatable. Micro-infrared spectroscopy reveals, significant peak intensity and position changes occurred in 1100-1500cm⁻¹ spectral region of nitrogen. UV - visible spectrophotometer test of the samples before and after experiment shows that the color has changed, the samples become light-colored. Synthetic diamonds at HTHP treatment changes occurred in diamond type from IaA + Ib to IaAB + Ib. The band theory can explain the reasons for diamond' s coloration.

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