Strength Measurements of Carbonado, A Natural Polycrystal Diamond.	X17B1

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Carbonado is a natural polycrystal diamond, and its texture can be similar to that of an artificial sintered diamond. Carbonado is expected to be one of the strongest material in terms of hardness, because each micro crystal constituting carbonado polycrystal is arranged without orientation and there exists direct covalent bonding of diamond between micro crystals. In the grain boundaries, it is known that some other minerals are contained as impurities. To obtain information on the strength of carbonado, we observed stress-induced line broadening of X-ray diffraction lines of carbonado diamond at high pressure and high temperature. The cell assembly we used is a typical high pressure cell for a DIA-type, cubic anvil, high pressure apparatus on X-17B1. Carbonado was loaded into a boron nitride capsule after grinding to powder. This was because a chunk sample (carbonado as it is) without powdering cannot be expected to reveal line broadening induced by grain contacts. NaCl powder was also loaded in the cell assembly for a pressure calibration, and a thermocouple was located in the center of the sample. Pressure was increased to around 10 GPa at room temperature, and (111) diffraction peak of diamond (carbonado) broadened and peak position shifted toward the lower d-spacing. At the highest pressure, temperature of the cell was increased to around 1500 degree C and change in the line shape was observed. We are going to compare the results from two different types of carbonado, and the difference from the artificial diamond powder will be considered.