

Allotropic Modifications of Carbon

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Carbon atoms have particular features, that account for the four possible conditions: non-excited, sp -, sp^2 -, sp^3 -hybridisations of electrons. This property of carbon explains the variety of the known allotropic forms. Now more than 10 allotropic modifications of carbon are known. According to the type of bonding, the carbon forms may be divided into five groups:

- sp^3 bondings: diamond, quasi-one-dimensional diamond, amorphous diamond-like carbon, lonsdaleite;
- sp^2 bondings: hexagonal graphite, rhombic graphite, cubic graphite, amorphous graphite-like carbon;
- sp bondings: chaoite, a-carbyne, b-carbyne;
- mixed sp^3+sp^2 bondings: diamond-graphite hybrids;
- mixed sp^3+sp^2+sp bondings: glass-like carbon (natural analog - shungite).

Many of these modifications are known only from synthesis experiments.

These forms are quasi-one-dimensional diamond, amorphous diamond-like carbon, cubic graphite, amorphous graphite-like carbon, a-carbyne, b-carbyne, diamond-graphite hybrids.

We discovered X-ray amorphous objects among skeleton diamonds; diamonds and graphite with structural elements of other allotropic carbon modifications at the Kumdikol metamorphic diamond deposit (Kazakhstan). Found among these natural objects may be the analogues of synthetic amorphous diamond-like carbon, diamond-graphite hybrids and other carbon hybrids.