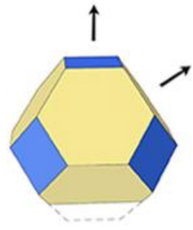
Diamond Crystal Growth

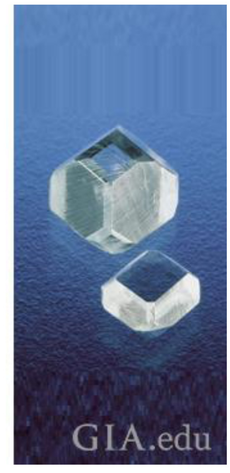
NATURAL AND LAB GROWN

Laboratory-grown CVD rough diamond (left), laboratory-grown HPHT rough diamond (middle) and natural rough diamond (right)

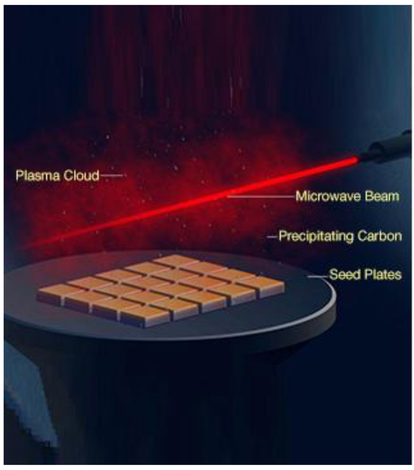
Growth Process	Typical Growth Morphology	Photo Example of Rough
Natural	**Shape:** Octahedron **Growth:** 8 directions	
High Pressure, High Temperature (HPHT)	**Shape:** Cuboctohedron **Growth:** 14 directions	
Chemical Vapor Deposition (CVD)	**Shape:** Cube **Growth:** 1 direction	

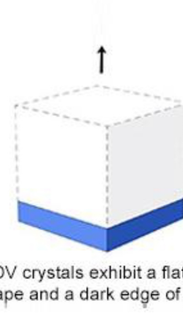


HPHT crystals exhibit both octahedral (yellow) and cube (blue) faces with a flat base.



In HPHT synthesis, a press (left) applies extremely high pressures and temperatures to a central growth chamber that contains the necessary ingredients. This results in synthetic diamond crystals with combinations of cubic and octahedral faces (center and right). Illustrations: Peter Johnston/GIA. Photo copyright: GIA & Tino Hammid





CDV crystals exhibit a flat tabular shape and a dark edge of graphite

In CVD synthesis, microwaves split apart the hydrocarbon molecules fed into the reactor (left). These fragments migrate down to the colder diamond seed and attach to the growing diamond surface.. The synthetic diamond grows in thin layers, and its final thickness depends on the amount of time allowed for growth. This results in flat, tabular crystals (center and right) with exteriors coated in black graphite. Illustrations: Peter Johnston/GIA

SOURCE: GEMOLOGICAL INSTITUTE OF AMERICA