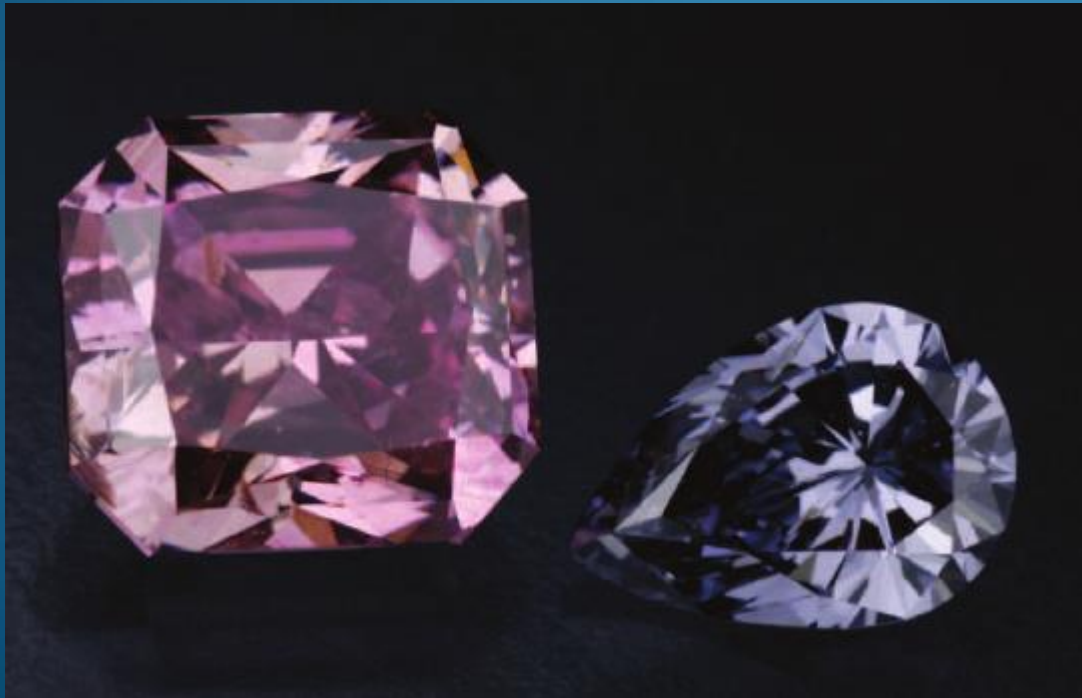


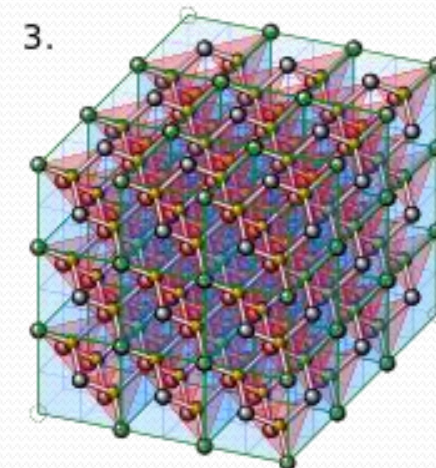
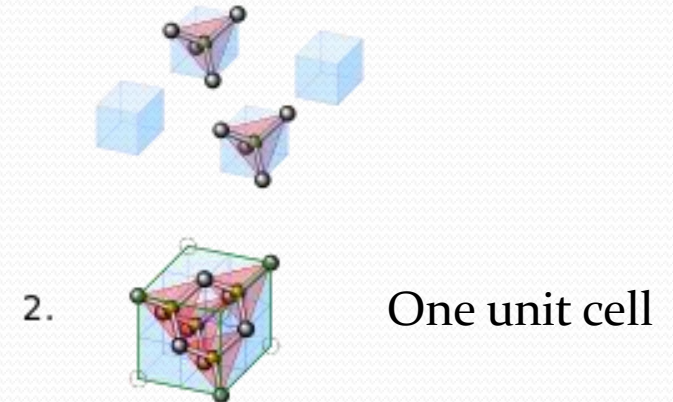
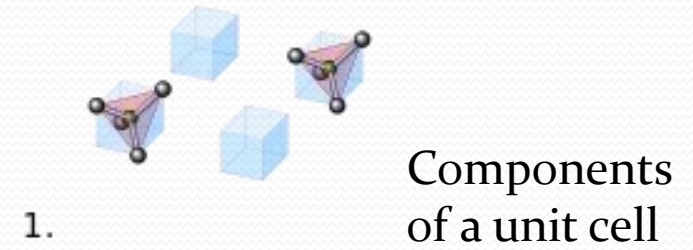
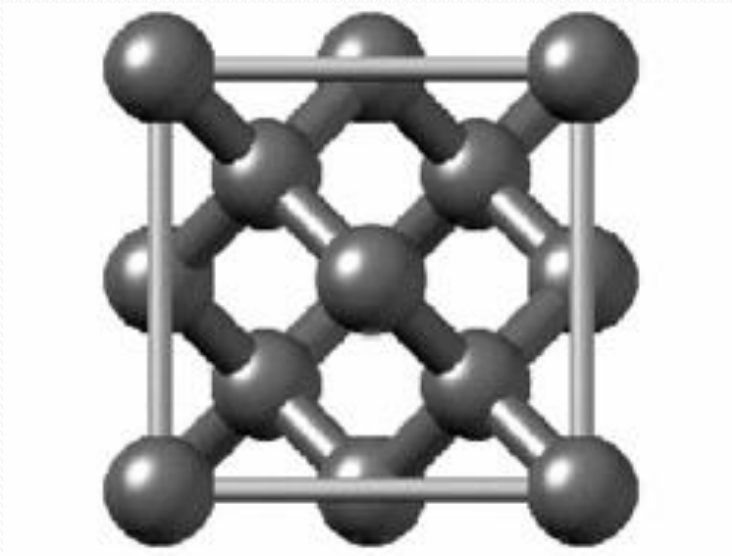
Nitrogen (N) impurities classification in natural diamonds



Diamond colors

Type	Natural Diamonds	Treated Natural Diamonds	Synthetic and Treated Synthetic Diamonds
Ia			
Ib			
IIa			
IIb			

Cubic crystallographic structure



A lattice of $3 \times 3 \times 3$ unit cells

Diamond Structure

- The space group of diamond is $F \bar{d}3m$.
- There are **eight carbon atoms** at the corner, **creating a cube**.
- The **six carbon atoms** in the faces **create an octahedron**.
- The **four internal carbon atoms** (black balls in figure) lie at $\frac{1}{4}$ of the distance along body diagonal **forming a tetrahedron**.

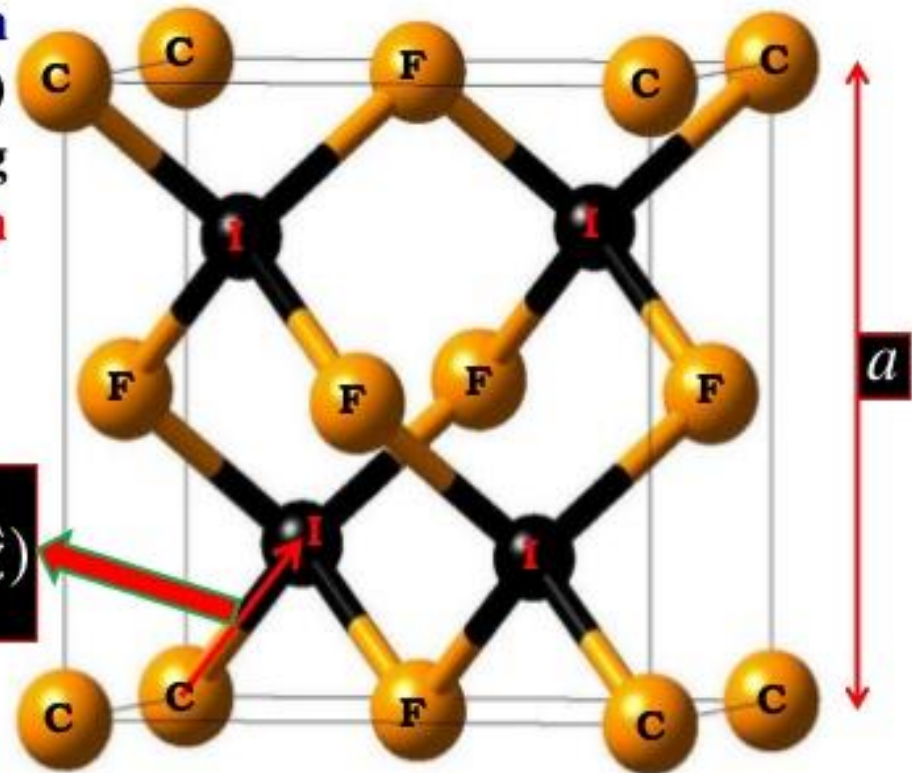
The letters on the ball mean:

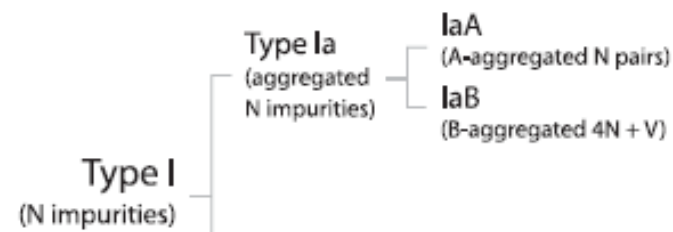
C – Corner atom

F – Face atom

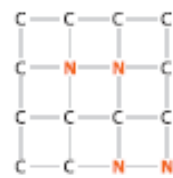
I – Internal atom

$$\frac{a}{4}(\hat{x} + \hat{y} + \hat{z})$$

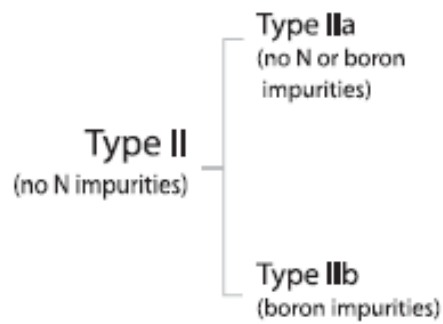
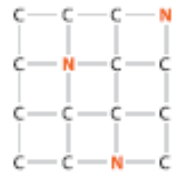
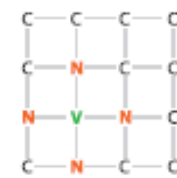




Type IaA

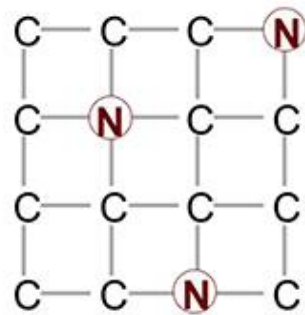
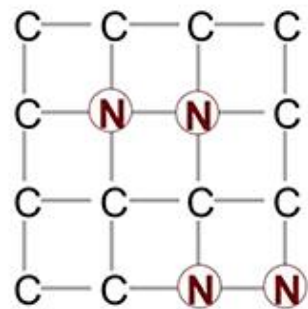


Type IaB



C = carbon atom
 N = nitrogen atom
 B = boron atom
 V = lattice vacancy

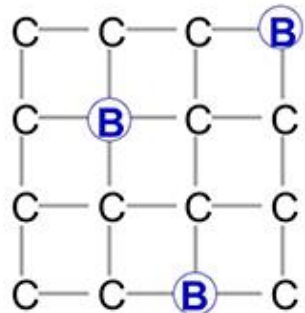
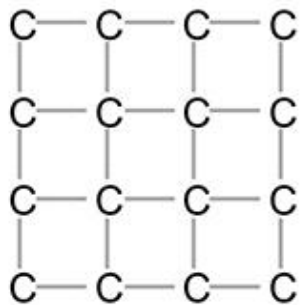
Type IaA



Type Ib



Type IIa

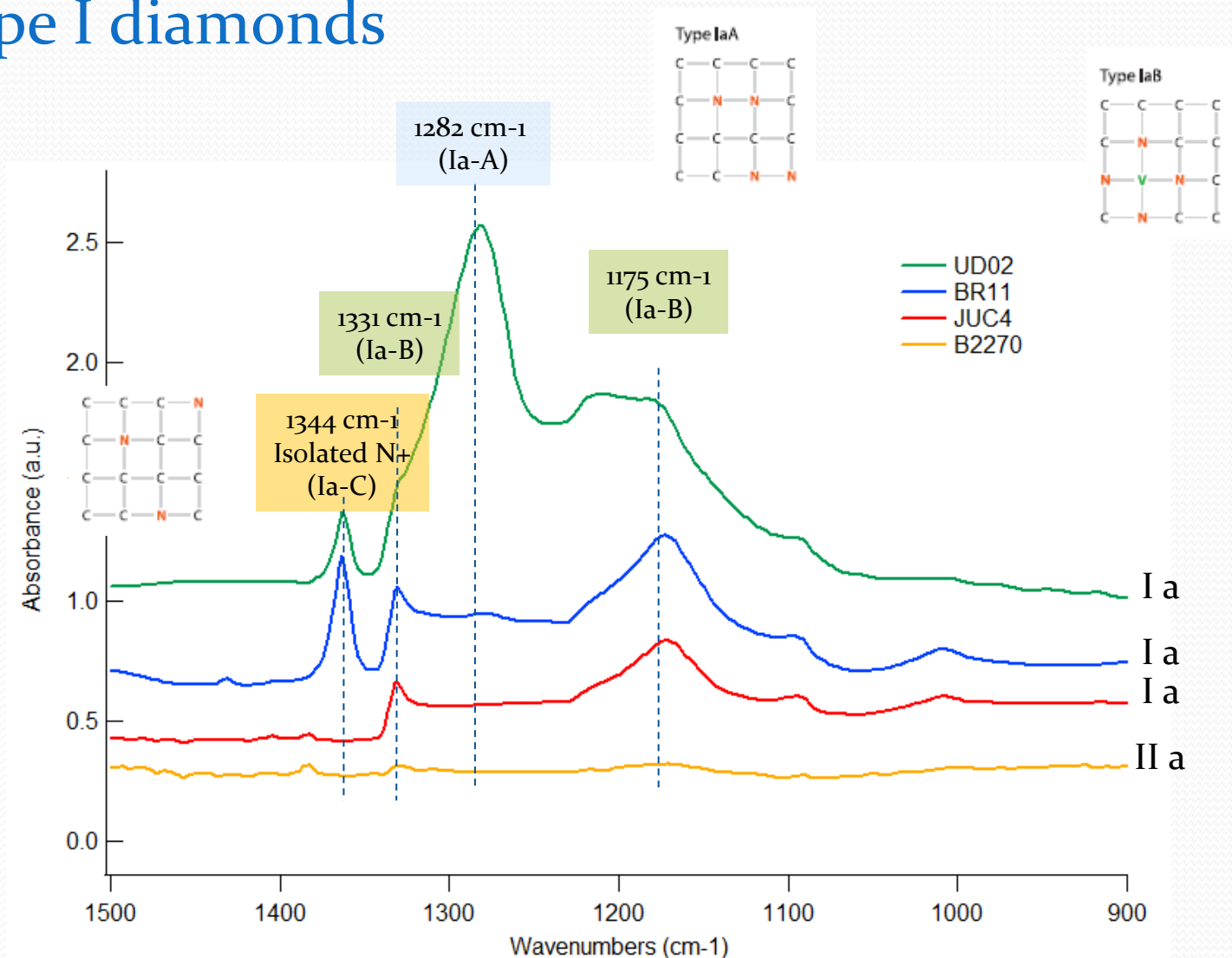


Type IIb



C = carbon atom, **N** = nitrogen atom, **B** = boron atom

Type I diamonds



Chemical imaging of N impurities in diamonds

Chemical Imaging

04/10/2016 13:27:56

