4. Ceramics:

→ Mixt. of AlO_2 & BN & sintered @ 1700°C which has very hard & good compressive strength.

→ Brittle, can't be used in shock & vibrations

→ 90% AlO_2 + 10% CrO_2, MnO_2 & NO_2

→ High compressive strength, longer tool life, flexibility, good surface finish & high temp. resistance 1000°C

Prop: * ↑ cutting speeds
* Rigidity of tool & w/p
* ↑ surface finish on cutting tool
* Eliminates unbalanced forces.

5. Diamonds:

→ Hardest cutting materials.

→ Polycryst. made by sintering under high pressure & temp.

→ Has low coeff. of friction, comp. strength ↑ & wear resistance.

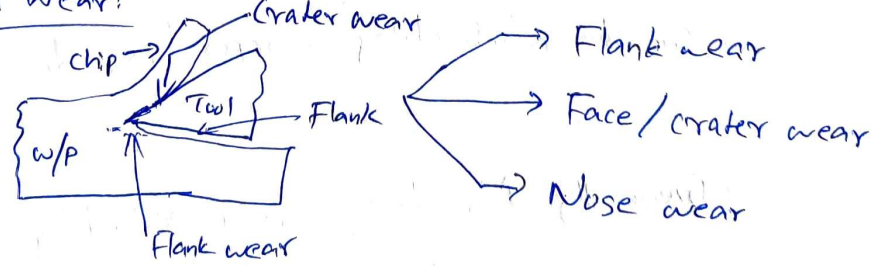
→ Used for machining very hard materials like glass, plastics, ceramics, etc.

→ ↑ surface finish @ ↑ speeds & good dimensional accuracy.

→ Very expensive & brittle

Prop.: * Hardest sub.
* ↓ coeff. of friction
* ↑ Heat cond.
* ↓ elec. cond.

Tool wear:



Flank wear: → edge wear aka Flank wear

→ Friction, abrasion & adhesions – main cause

→ Flat worn out region behind cutting edge.

→ Takes place in rough machined surface

Crater wear: → Tool face - contacts always w/ chip.
→ chip sliding gradually wears off the face
→ cavity formed on tool face is called crater
→ Due to abrasion b/w chip & tool face
→ results in breakage of cutting edge of the
→ Tool life = fixing ratio of width of crater to its depth.

Nose wear: → More prominent than flank wear
→ Tool life = cutting time reqd. for reaching a tool life critically or time elapsed bef 2 consec. tool resharpenings.

→ Ways to express tool life:
(i) Vol. of metal removed or ground
(ii) No. of w/p machined or ground
(iii) Time taken per unit.

Machinability:

→ M/cing may be easier in some materials and diff. in others.

→ It is defined as ease with which a material can be satisfactorily machined.

* Tool life bef. tool failure (or) resharpening
* Quality of machined surface
* Power consumption per unit volume of material removed

→ Good machinability → proper chips → ↓ tool wear → ↑ surface finish

→ Generally ↑ hardness → poor machinability (or ↑ temp) more power consumption & high tool wear.