
The Magic of Ceramics -- Study Guide, Chapter 11

1. What is the hardest material?
2. How much harder are ceramics than typical metals?
3. What is a cermet?
4. What was the major limitation of early ceramic cutting tool inserts?
5. Name several ceramics with higher toughness that were successfully used as cutting tools.
6. What ceramic coatings have been successful in increasing the life of metal-based cutting tools?
7. What did Tracy Hall achieve in 1954?
8. What temperature and pressure did Hall need to achieve?

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9. Why is diamond so hard but silicon that has the same atom arrangement is not as hard?

 10. A major innovation has been learning how to produce diamond and diamond-like coatings at low pressure and low temperature. Name some benefits of a diamond or diamond-like carbon coating.

 11. Why are ceramics important for seals, valves, and pump parts?

 12. Describe three different types of valves.

 13. How are ceramics important in the papermaking industry?

 14. How are ceramics important in the textile industry?

 15. How severe are the conditions a material must survive in a sucker pump in the oil industry?

 16. Why is ceramic armor more effective than steel?