

CLIL

CARBON

Vytvořeno v rámci projektu Zvýšení jazykové kompetence
2016-1-CZ01-KA101-023159

Erasmus + Vzdělávací mobilita jednotlivců – Mobilita – Mobilita
pracovníků školy



Erasmus+

CARBON

- Chemical nonmetallic element
- Symbol C
- Atomic number 6
- Tetravalent - makes four electrons available to form covalent chemical bonds
- Known since antiquity
- The fourth most abundant chemical element
- Natural allotropes: graphite, diamond

Graphite

Diamond



Picture 1

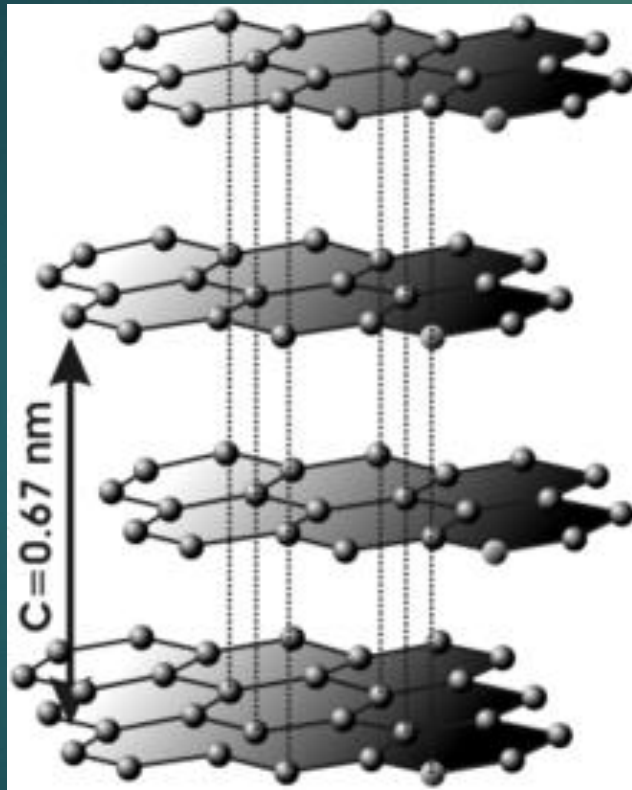


Picture 2

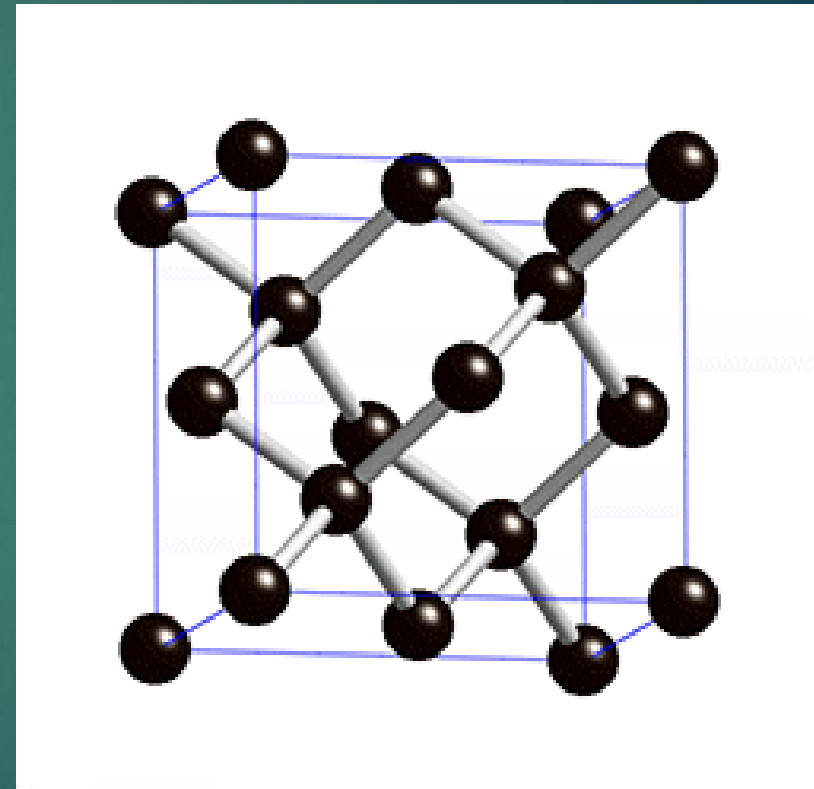
Why different

graphite - hexagonal

diamond - cubic

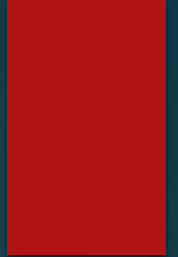


Picture 3



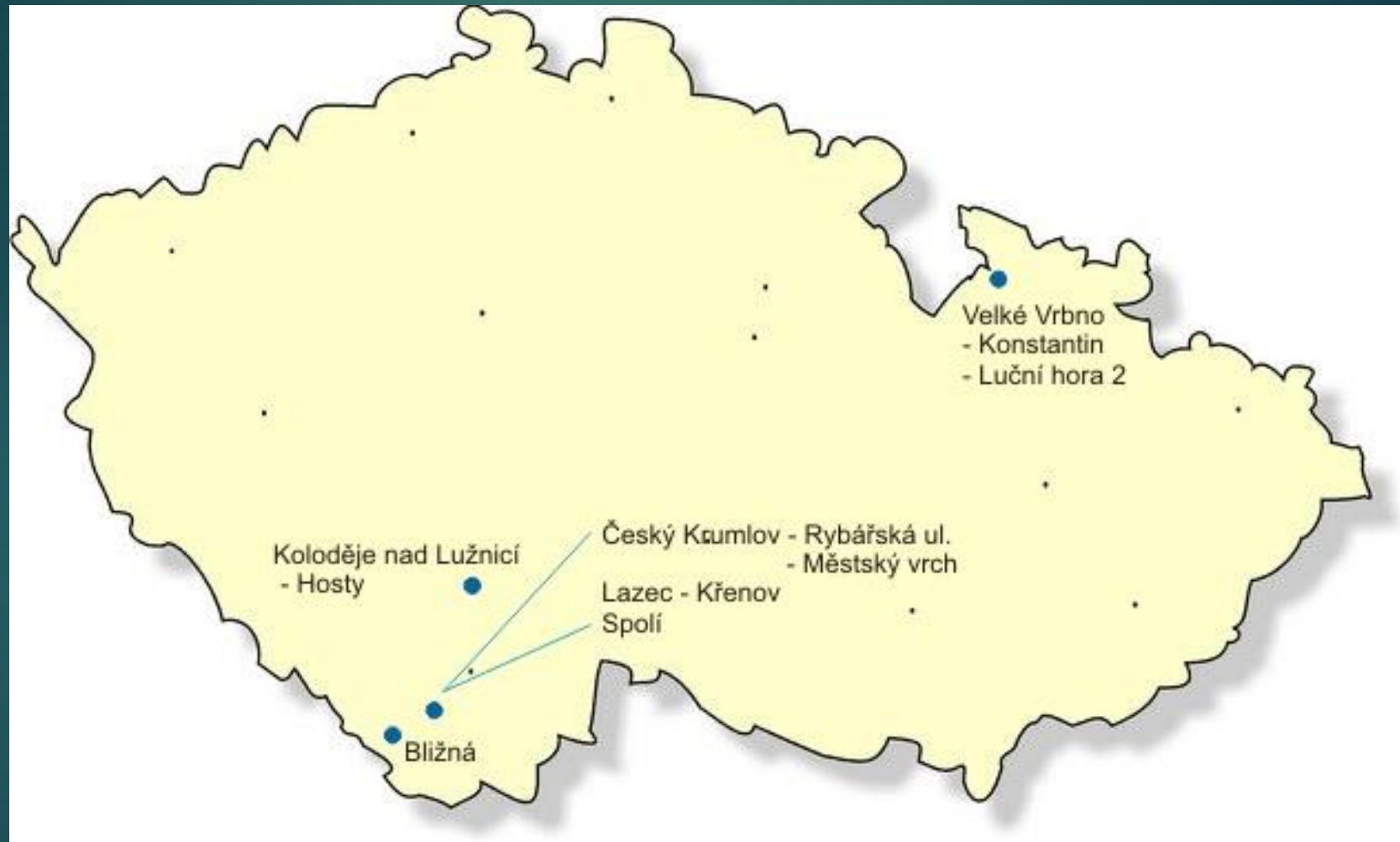
Picture 4

Grafit



- Natural deposit of graphite in the world:
 - China 80% world production
 - Germany –Passau, Harz Mountains
 - USA – Alabama, New Jersey, New York
 - Russia– Siberia
 - Canada – Québec
 - Sri Lanka
 - Madagascar

Czech deposits of graphite



Picture 5

Properties of graphite

Physical characteristics

glides over the paper

rubbed with a finger (a hardness 1)

greasy to the touch

density of 2.1 to 2.3 g / cm³ (varies due to impurities)

cleavage perfect

melting point is about 3000 ° C

well conducts electricity

black, dark gray to steel

transparency: opaque

luster to dull metal

Fyzikální vlastnosti

klouže po papíru

lze otřít prstem (tvrdost 1)

mastný na dotek

hustota 2,1 až 2,3 g / cm³ (mění se podle nečistot)

perfektní štěpnost

teplota tání je asi 3000 ° C

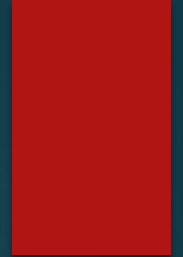
dobře vede elektřinu

černá, tmavě šedá na ocel

transparentnost: neprůhledná

kovový lesk

Graphite use



- pencils
- coals as part of various electric household appliances (blender, washing machine, vacuum cleaner etc.)
- graphite rods - to control reactions in nuclear reactors
- metallurgical industry - high thermal resistance
- graphite electrodes - for the electrolytic production of aluminum or silicon
- graphite vaseline

Diamond

The current world's major diamond deposit

- Botswana
- Russia (Siberia)
- Canada
- South Africa
- Angola
- Australia

- CR - Chrástany (Rakovník)
Dlažkovice (Litoměřice)

Siberia – diamond mine Udačnaja

1,6 km / 600 m



Picture 6

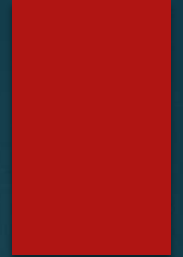
Properties of diamond

- the only gemstone in all colour modifications
- most often white or colourless
- hardness of 10 on the Mohs scale
- density 3.52 to 3.6 g cm³
- a high index of refraction
- high thermal conductivity
- do not conduct electricity

Diamond use

- jewelery
- Industry - cutting, drilling and grinding tools
powders and pastes
diamond dust
- industrially produced diamonds
- special electronic components
- laboratory research

Points of Interest



- Diamonds are valued by 4C classes:
 - carat
 - clarity
 - colour
 - cut
- The weight of a diamond is measured in carats
- Metric carat is defined as 0.2 g and is denoted **ct**
- The unit weight - historically evolved from the weight of St. John's Bread seed

The biggest diamonds

Cullinan

rough 3,106.75 ct



Picture 7

Hope

45,5 ct \$250 mil



Picture 8



Picture 9

Questions

- ▶ 1. What is carbon?
- ▶ 2. What natural allotropes does carbon form?
- ▶ 3. Why are they different?
- ▶ 4. Where is the largest deposit of graphite?
- ▶ 5. What are graphite properties?
- ▶ 6. What is graphite use?
- ▶ 7. Where can we find diamonds?
- ▶ 8. What are diamond properties?
- ▶ 9. What is diamond use?
- ▶ 10. Compare graphite and diamond properties.

Použité zdroje

- ▶ Picture 1 Graphite. (2017, July 7). In *Wikipedia, The Free Encyclopedia*. Retrieved 10:23, July 11, 2017 from <https://en.wikipedia.org/w/index.php?title=Graphite&oldid=789502863>
- ▶ Picture 2 Diamant. (2016, august 16). *Wikipédia, Slobodná encyklopédia*. Získané 10:30, júl 11, 2017 z [//sk.wikipedia.org/w/index.php?title=Diamant&oldid=6348616](https://sk.wikipedia.org/w/index.php?title=Diamant&oldid=6348616).
- ▶ Picture 3 Grafit. (2013, novembar 24). '*Wikipedia*, . Preuzeto 01:33, novembar 24, 2013 iz [//sh.wikipedia.org/w/index.php?title=Grafit&oldid=1742081](https://sh.wikipedia.org/w/index.php?title=Grafit&oldid=1742081)
- ▶ Picture 4 File:Diamond Cubic-F lattice animation.gif. (2016, October 21). *Wikimedia Commons, the free media repository*. Retrieved 10:32, July 11, 2017 from https://commons.wikimedia.org/w/index.php?title=File:Diamond_Cubic-F_lattice_animation.gif&oldid=210374267.
- ▶ Picture 5 [online]. Dostupné z: [www: http://geologie.vsb.cz/loziska/loziska/loziska_cr.html](http://www.geologie.vsb.cz/loziska/loziska/loziska_cr.html)
- ▶ Picture 6 Diamant. (3. 03. 2017). *Wikipedie: Otevřená encyklopedie*. Získáno 10:34, 11. 07. 2017 z <https://cs.wikipedia.org/w/index.php?title=Diamant&oldid=14758024>.
- ▶ Picture 8 Diamant. (3. 03. 2017). *Wikipedie: Otevřená encyklopedie*. Získáno 10:34, 11. 07. 2017 z <https://cs.wikipedia.org/w/index.php?title=Diamant&oldid=14758024>
- ▶ Picture 7 File:Cullinan copie 1(République d'Afrique du Sud).jpg. (2014, February 10). *Wikimedia Commons, the free media repository*. Retrieved 10:42, July 11, 2017 from [https://commons.wikimedia.org/w/index.php?title=File:Cullinan_copie_1\(R%C3%A9publique_d%27Afrique_du_Sud\).jpg&oldid=116105568](https://commons.wikimedia.org/w/index.php?title=File:Cullinan_copie_1(R%C3%A9publique_d%27Afrique_du_Sud).jpg&oldid=116105568).
- ▶ Picture 9 File:Cullinroughpieces.jpg. (2016, October 17). *Wikimedia Commons, the free media repository*. Retrieved 10:36, July 11, 2017 from <https://commons.wikimedia.org/w/index.php?title=File:Cullinroughpieces.jpg&oldid=210054464>.