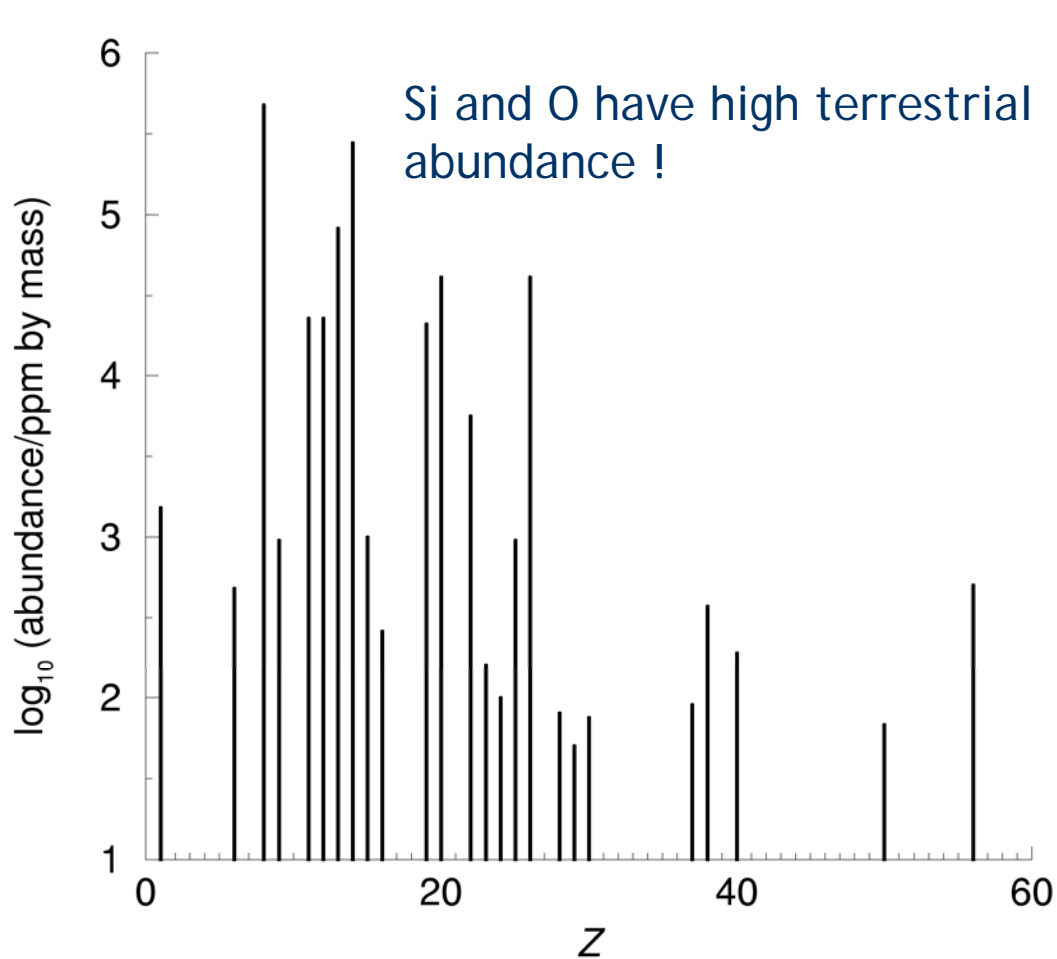


## Class 14: SiO<sub>4</sub> Building blocks



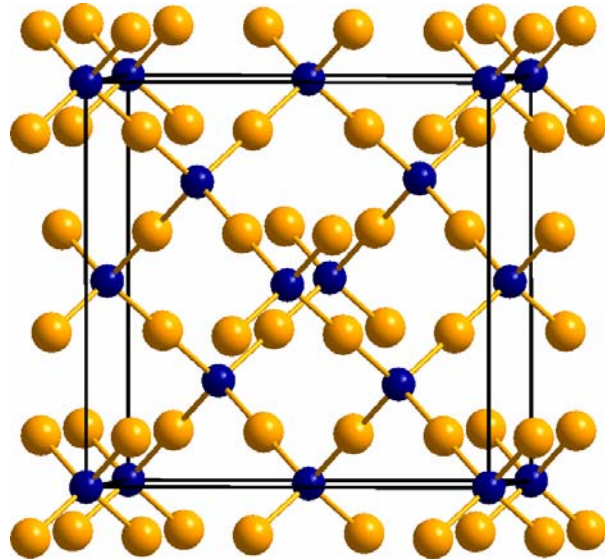
8	474000	Oxygen
14	277000	Silicon
13	82000	Aluminum
26	41000	Iron
20	41000	Calcium
11	23000	Sodium
12	23000	Magnesium
19	21000	Potassium
22	5600	Titanium
1	1520	Hydrogen
15	1000	Phosphorus
25	950	Manganese
9	950	Fluorine
56	500	Barium
6	480	Carbon
38	370	Strontium
16	260	Sulfur
40	190	Zirconium
23	160	Vanadium
15	130	Chlorine
24	100	Chromium
37	90	Rubidium
28	80	Nickel
30	75	Zinc
50	68	Cerium
29	50	Copper

From J. Emsley, *The Elements*, II edn. Clarendon, Oxford

## Class 14: SiO<sub>4</sub> Building blocks

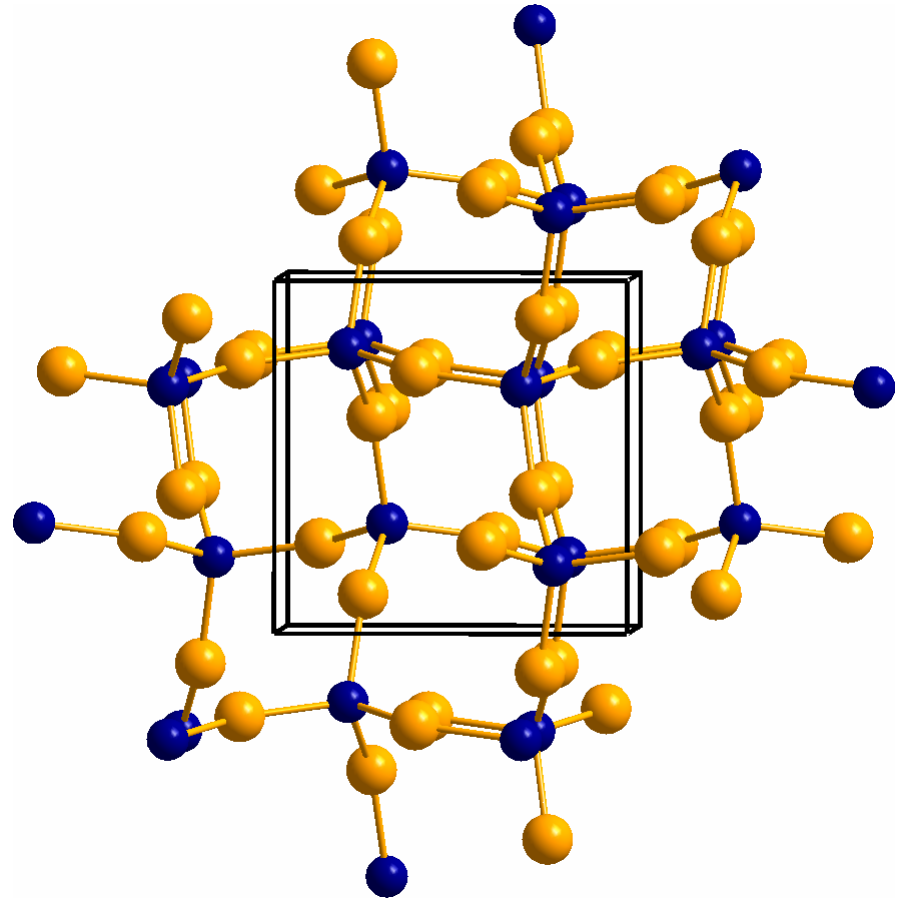
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Structures (385 Si-O in the database):



Ideal cristobalite:  
Diamond Si with O  
between every two Si.  
*Fd-3m*

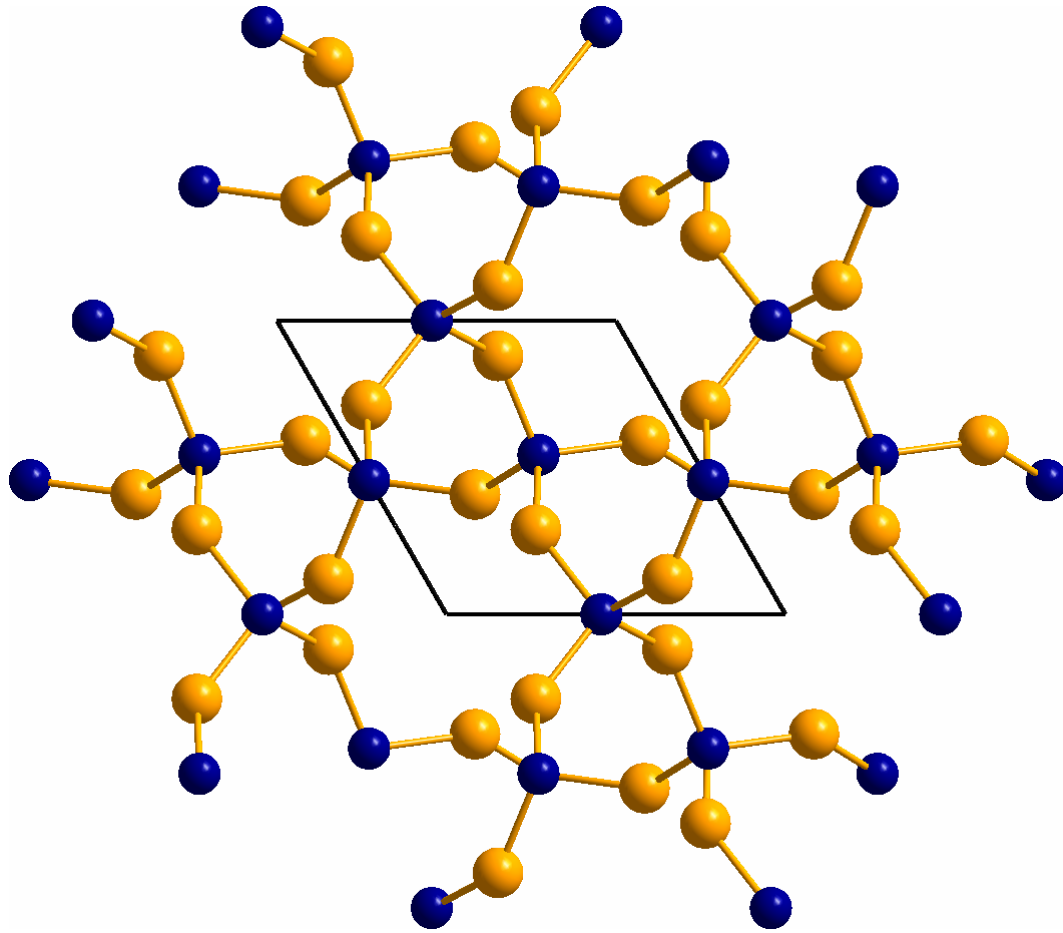
“Low” cristobalite: *P4<sub>1</sub>2<sub>1</sub>2*



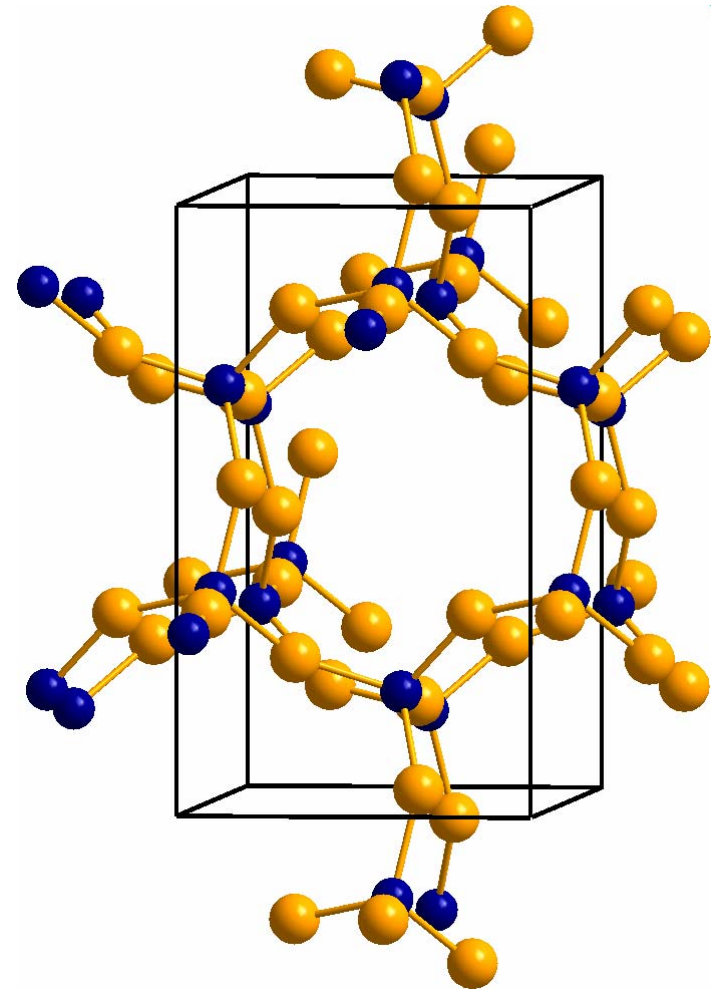
## Class 14: SiO<sub>4</sub> Building blocks

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Structures (385 Si-O in the database):



Tridymite (wurtzite derived)



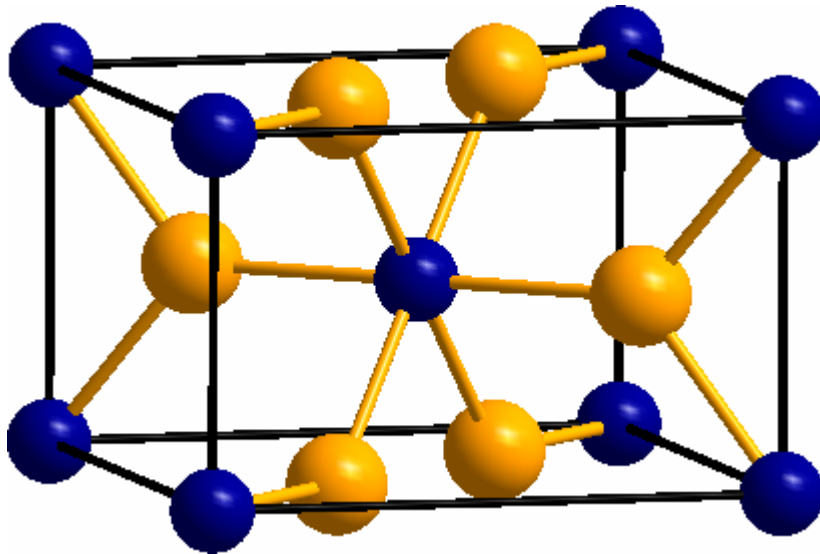
"low" tridymite

## Class 14: SiO<sub>4</sub> Building blocks

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Structures (385 Si-O in the database):

Stishovite (rutile) formed under pressure and 6-coordinate:

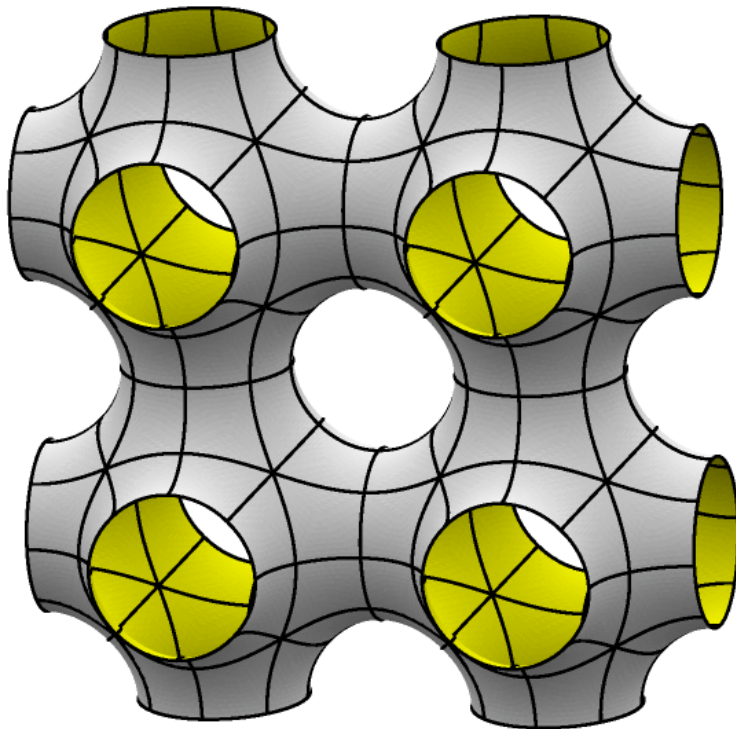


## Class 14: $\text{SiO}_4$ Building blocks

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Silicate structures: (see handout)

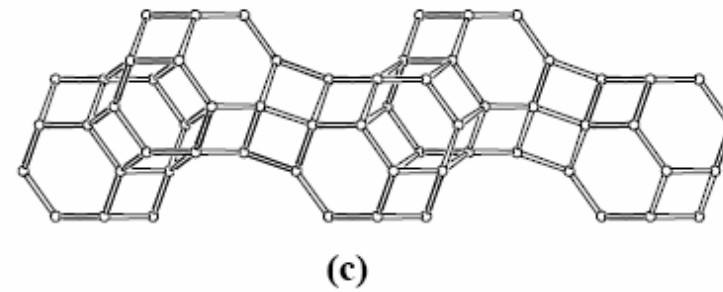
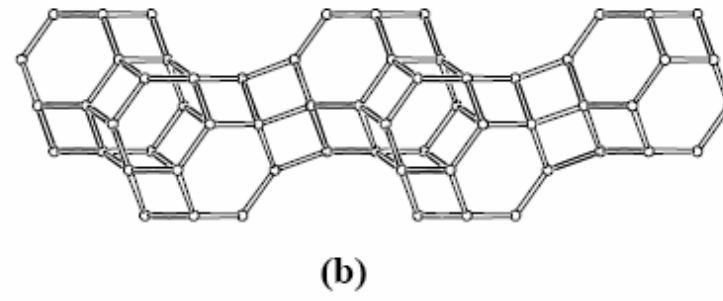
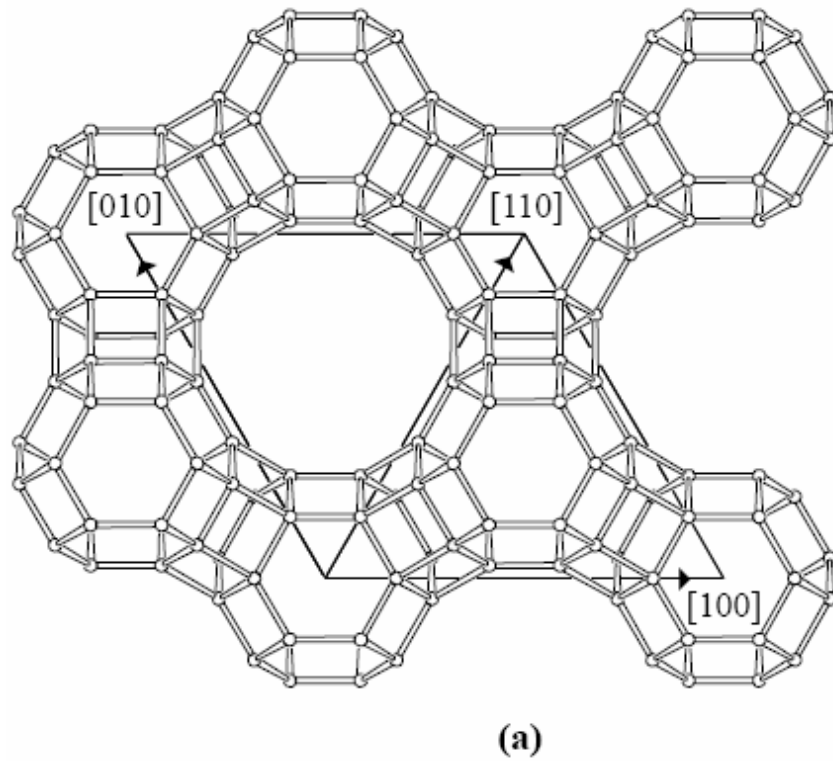
Zeolites:  $\text{SiO}_4$  units can decorate *minimal surfaces*



Surface evolver webpage of Ken Brakke

## Class 14: SiO<sub>4</sub> Building blocks

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### Cages in Faujasite