Dehydroxylation Mechanism of Kaolinite into Metakaolin (MK-750)

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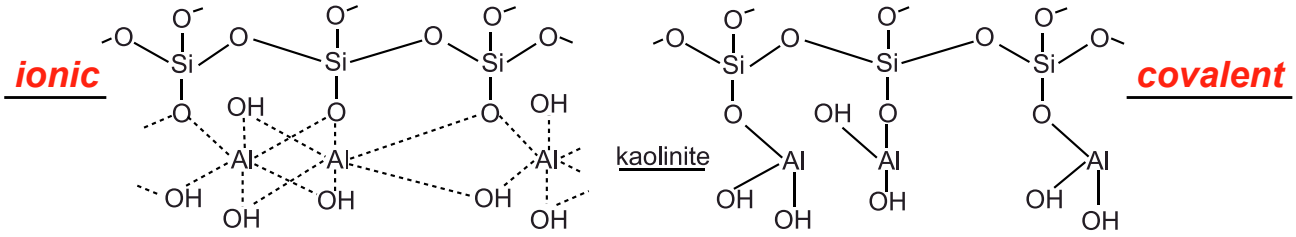
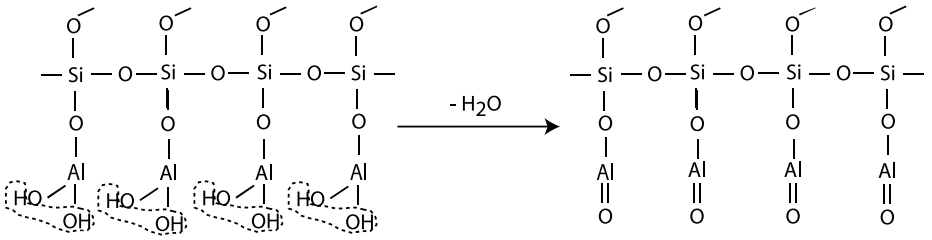
The ***ionic*** concept (6-fold coordination) cannot explain why dehydroxylation of kaolinite into metakaolin MK-750 produces Al atoms in IV-, V- and VI coordination. In the geopolymeric ***covalent*** concept, the Al hydroxyl layer in kaolinite highlights the trivalent character of the Al atom -Al(OH)2



Al 6-fold coordination
(after Pauling, 1930)

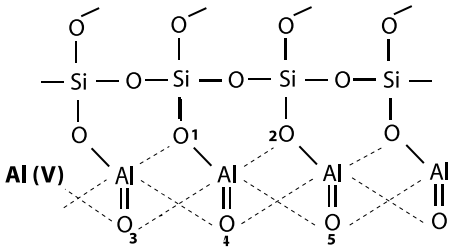
Al tri-valent bonding

Formation of Al(V): intra-dehydroxylation



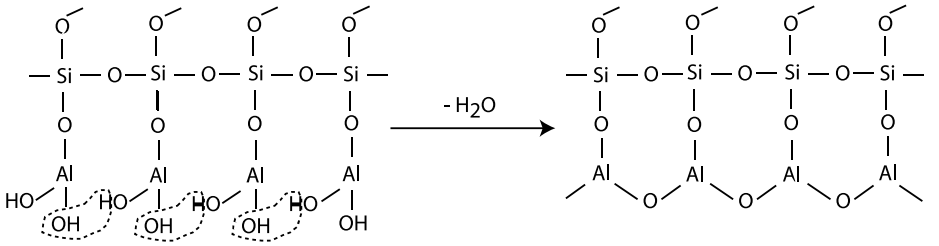
dehydroxylation between OH groups of same Al atom

formation of the oxide –Al=O (alumoxyl)



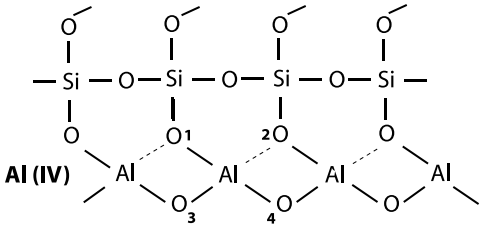
V-fold coordination.

Formation of Al(IV): inter-dehydroxylation



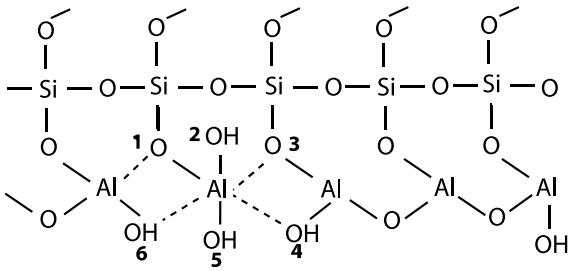
dehydroxylation between OH of two neighboring Al atoms

creation of the covalent sequence -Al-O-Al-O-



IV-fold coordination

Formation of Al(VI): partial inter-dehydroxylation



VI-fold coordination

Details in the book *Geopolymer Chemistry & Applications*