

REDOX BEHAVIOUR OF IRON IN MICRO- AND MESOPOROUS FERRISILICATES

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Insertion of iron into porous ferrisilicates may result in changes of the original structures. For example, this insertion enables the structure to take part in reversible $\text{Fe}^{2+} \leftrightarrow \text{Fe}^{3+}$ redox process. This process may play an important role e.g. in catalytic procedures.

The structure of the host may provide different locations for the iron. In microporous systems (analogous with zeolites, with characteristic pore sizes of 0.5 nm) the framework vs. extra-framework distinction is obvious, since these structures are strictly crystalline (in three dimensions). In contrast, mesoporous structures of 3 – 5 nm characteristic pore dimension, exhibit crystallinity uppermost in two dimensions, since their pore walls are partly amorphous. The appearance of the $\text{Fe}^{2+} \leftrightarrow \text{Fe}^{3+}$ redox behaviour of iron in micro- and mesoporous systems, its correlation with coordination changes strongly depend on the structure. In general, crystallinity stabilizes the Fe^{3+} state, and the $\text{Fe}^{3+} \leftrightarrow \text{Fe}^{2+}$ change may be correlated with change of the position occupied in the structure. For demonstration, some examples are to be presented by comparing the behaviour of iron located in in microporous (MFI, FER, MCM-22) and mesoporous (MCM-41 and SBA-15) structures.