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# Synthesis of 1:1 and 2:1 Iron Phyllosilicates and Characterization of their Iron State by Mössbauer Spectroscopy

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**Abstract:** Iron phyllosilicates with 1:1 and 2:1 layer structures were prepared from silicic acid, ferrous sulfate and sodium hydroxide. Hydrothermal treatment at 100– 200° C of a reaction mixture with an initial Fe/Si ratio of 1.5 gave the 2:1 iron phyllosilicate, whereas a Fe/Si ratio of 2.25 gave the 1:1 phyllosilicate. The <sup>57</sup>Fe Mössbauer spectroscopy showed that 60% of the iron in the 1:1 phyllosilicate is ferrous, versus only 3% in the 2:1 phyllosilicate. The values of quadrupole coupling showed that the iron-oxygen tetrahedra and octahedra in the 2:1 phyllosilicate were more deformed than those in the 1:1 phyllosilicate.

**Key Words:** Iron • Mössbauer spectroscopy • Phyllosilicate • Synthesis

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