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ABSTRACT BOOK
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**CHEMISTRY ASPECTS OF MODERN ENERGY
AND ALTERNATIVE ENERGY RESOURCES**

**CHEMISTRY OF FOSSIL AND RENEWABLE
HYDROCARBON RAW MATERIALS**

**ANALYTICAL CHEMISTRY: NOVEL METHODS
AND DEVICES FOR CHEMICAL RESEARCH AND
ANALYSIS**

CHEMICAL EDUCATION

**APPLICATION OF MÖSSBAUER SPECTROSCOPY
FOR STUDY OF GREEN RUST STABILIZED
WITH HUMIC SUBSTANCES**

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Humic Substances (HS) are ubiquitous natural organic compounds of fossil fuel, soil and water organic matter. They possess a set of functional groups, which provides an ability of HS to form organo-inorganic compounds with metal ions, oxides and other inorganic compounds. In this study it was shown, that synthesis of iron enriched humic derivatives by addition of iron (II) sulfate with sulfuric acid in potassium humate allows to stabilize up to 30 % of total iron in the form of Fe (II). Using Mössbauer spectroscopy it was shown that Fe (II) is stabilized in organo-inorganic compounds with HS in the form of layered double hydroxides Fe(II)/Fe(III), also known as green rust.¹ Mössbauer parameters of Fe-HS organo-inorganic compounds and green rust sample obtained at 78 K are given below in the Table 1.

Table 1. Mössbauer parameters of studied sample obtained at 78 K

Sample	Spectrum component*	Redox state of Fe	I _s	Q _s	G	H, kOe
			mm/s			
Fe-HS	D ₁	+2	1,25	2,75	0,41	–
	D ₂	+3	0,48	0,71	0,58	–
[Fe ²⁺ _{1-x} Fe ³⁺ _x (OH) ₂] ^{x+} [x/2SO ₄ ²⁻ , mH ₂ O] ^{x-}	D ₁	+2	1,28	2,91	0,24	–
	D ₂	+2	1,42	3,34	0,36	–
	D ₃	+3	0,46	0,50	0,34	–
	S ₁	+3	0,53	–0,25	0,40	489
	S ₂	+3	0,56	–0,29	0,55	462

*Spectrum components abbreviations: D-dublet, S- sextet

REFERENCES

1. *Géhin, A., C. Ruby, et al.* (2002). "Synthesis of Fe(II-III) hydroxysulphate green rust by coprecipitation." *Solid State Sciences* 4: 61–66.