SUPPLEMENTARY MATERIALS

S1. SEM images of the samples (JEOL-6510L microscope)

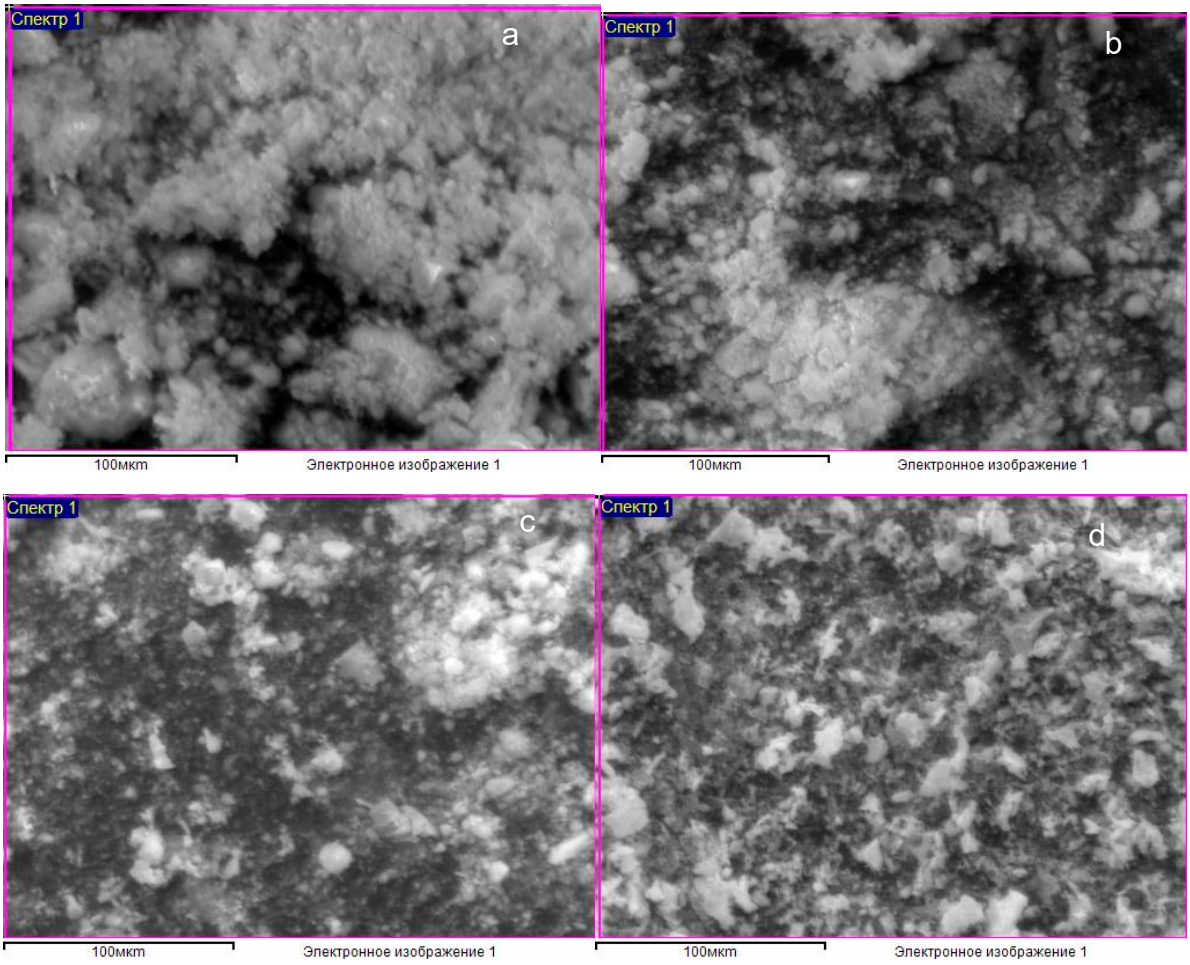

Figure S1. SEM-images of zeolite (a), composite Zt-2F (b), composite Zt-16F (c) and zinc ferrite (d)

S2. Elemental mapping of the samples (scanning electron microscope JSM-6380LV (JEOL, Japan) with an energy dispersive microanalysis system INCA 250)

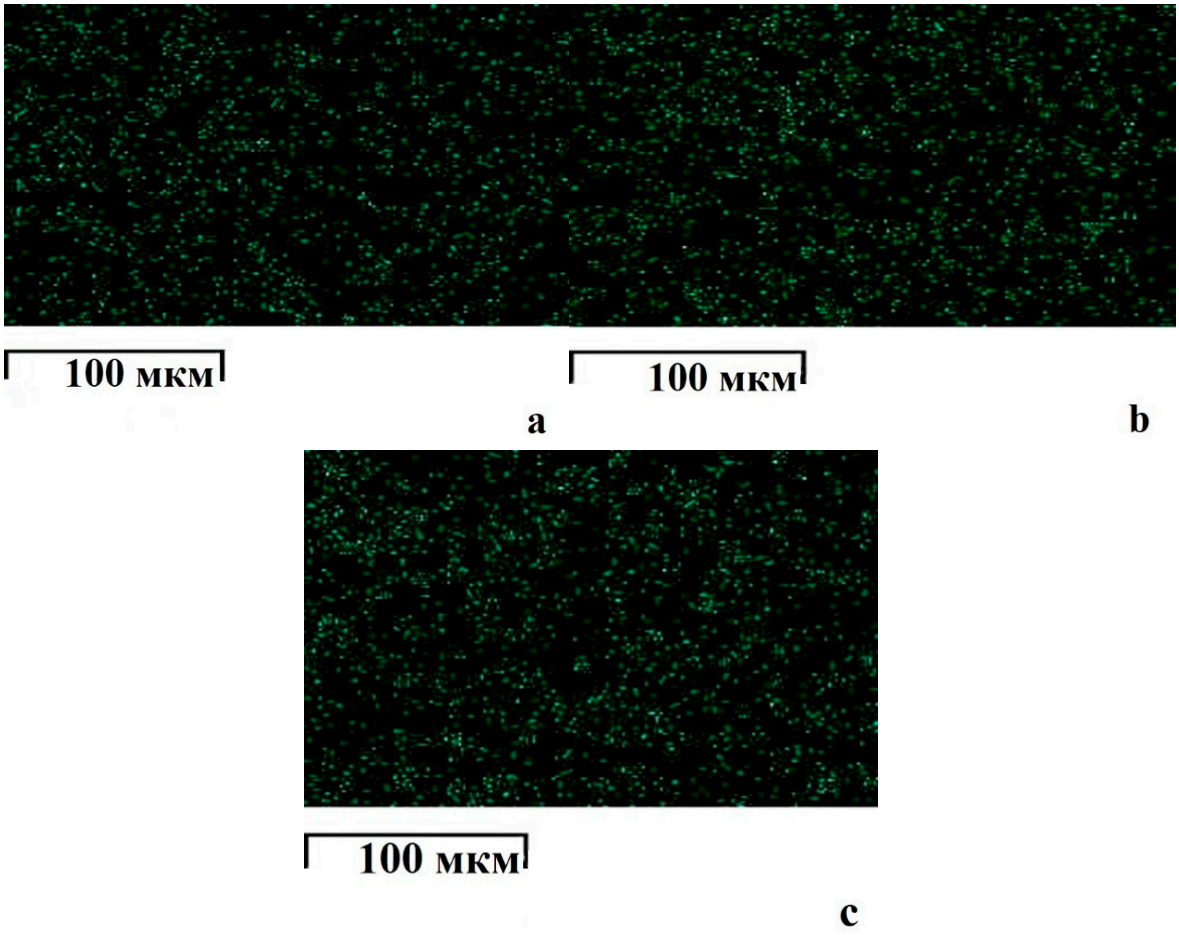

Figure S2. EDX elemental mapping of copper after adsorption of Cu^{2+} from solution at the surface of investigated samples: a - Zt-Cu; b – Zt-16F-Cu; c – F-Cu

S3. pH of aqueous solutions of $CuSO_4$

Table S1. pH of aqueous solutions of $CuSO_4$ at t=20°C

Concentration, C_N, mole-eqv/L	pH	C_{H+}, mole/L	Rate of hydrolysis, h, %
0.0025	5.34±0.08	$4.6*10^{-6}$	0.37
0.005	5.36±0.07	$4.4*10^{-6}$	0.18
0.01	5.19±0.23	$6.45*10^{-6}$	0.13
0.025	4.86±0.11	$1.38*10^{-5}$	0.11
0.05	4.68±0.05	$2.1*10^{-5}$	0.08

0.075	4.43±0.20	$3.7*10^{-5}$	0.10
0.1	4.38±0.23	$4.17*10^{-5}$	0.08

Considering hydrolysis reactions in aqueous solutions of $CuSO_4$. pH values of solutions were controlled to assess degree of hydrolysis (Table S1):

$2CuSO_4 + 2\ H_2O \Leftrightarrow (CuOH)_2SO_4 + H_2SO_4$

$2Cu^{2+} + 2SO_4^{2-} + 2H^+OH^- \Leftrightarrow 2CuOH^+ + 2H^+ + 2\ SO_4^{2-}$

$2Cu^{2+} + 2H^+OH^- \Leftrightarrow 2CuOH^+ + 2H^+$, pH<7

Degree of hydrolysis was calculated by expression:

$$h = \frac{C_{H^+}}{C_{salt}} \cdot 100\% .$$

where C_{H+} and C_{salt} – molar concentrations of H^+ and salt in solution respectively (mole/L).

As follows from Table S1, degree of hydrolysis of copper sulfate did not exceed 0.4 %, hence, the major part of dissolved salts was represented by hydrated Cu^{2+}ions which were the main ions being sorbed.

S4. Desorption of Cu^{2+} from sample of $ZnFe_2O_4$ by various electrolyte solutions

Table S2. Desorption of Cu^{2+} from $ZnFe_2O_4$ sample by various electrolyte solutions

Sample	Cu^{2+} amount desorbed, Q_{des}, mg/g			Cu^{2+} adsorbed from 0.01N $CuSO_4$, a(Cu), mg/g	Degree of desorption by 0,1 N HCl, Q_{des}/a(Cu)
	0,1 N NaCl	0,1 N NaOH	0,1 N HCl		
F	0	0	66.81	67.07	99.6 %
Zt	n.a.	n.a.	12.36	16.17	76.4
Zt-8F (after 5 cycle)	n.a.	n.a.	5.1	11.28 (at 5 cycle)	45.2