


EVOLUTION OF THE MICROSTRUCTURE OF MINERAL SYSTEMS IN ELECTRIC AND MAGNETIC FIELDS OF WEAK INTENSITY

SOBOLEV Valerii¹, BILAN Nataliia¹, MELNYKOV Dmitro² & KURLIAK Anton²
¹Dnipro University of Technology, Dnipro, Ukraine
²State Enterprise Research-Industrial Complex "Pavlograd Chemical Plant", Pavlograd, Ukraine

Purpose. Study of phase and structural effects in solid mineral systems caused by the development of spin-selective chemical reactions initiated by the action of a weak magnetic field.

Methodology. Experimental studies of the influence of weak electric and magnetic fields were carried out with the aim to establish regularities of microstructural and phase transformation in solids. Numerical modeling involving quantum mechanical regularities were adapted to estimation of energy changes of chemical bond. Raman spectroscopy, electron paramagnetic resonance, nuclear magnetic resonance, infrared spectroscopy, thermogravimetric analysis and differential scanning calorimetry, laser diffraction analysis of particle sizes, etc. were used for physiochemical studies.

Findings. The effect of an abrupt decrease in the electrical resistance of siderite upon heating and the simultaneous action of a weak current and the action of a weak magnetic field is established. The jump in resistance is due to spontaneous formation of a new carbon phase, mainly with an electronic type of conductivity. The action of a weak magnetic field on hard coal leads to an increase in the C:H ratio by 3-7%, a decrease in volatiles by 8-10%; increase the size of microparticles of crushed coal by 35-55%. These changes in composition can be interpreted as one of the possible chemical acts of coalification. The action of an electric field on coal leads to the contrary result, including the stimulated gasification of coal.
They contain the researches, which were conducted within the project GP – 491, financed by Ministry of Education and Science of Ukraine.

**Key words:** siderite, calcite, coal, magnetic field, phase transitions, chemical reactions

**References**

   DOI: https://doi.org/10.1070/RC1995v064n09ABEH000177
   DOI: https://doi.org/10.1070/RC1999v068n02ABEH000487
   DOI: 10.1021/jp011261d

**STUDYING REGULARITIES OF AIR MOVEMENT THROUGH A FILTERING HALF-MASK**

CHEBERIACHKO Sergiy, YAVORS’KA Olena, YAVORSKYI Andrii & TYKHONENKO Valeriia

1Dnipro University of Technology, Dnipro, Ukraine

**Purpose.** Objective is to study the available approaches to calculate pressure difference of filtering respirators, to determine theoretical dependences of its change in terms of different filtering rate according to the breathing process with the use of filtering models of interconnected channels and parallel cylinders, and to generalize the results obtained in the context of mathematical models.