

## Phase states of the gypsum thermal-annealing derivatives according to electron spin resonance spectra

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### Abstract

The electron spin resonance (ESR) spectra of  $\text{SO}_3^-$  and  $\text{SO}_2^-$  radical ions with a linewidth  $\Delta H \approx 2.7$  G and  $\text{SO}_3^-$  (A 1) and  $\text{SO}_3^-$  (A 2) centers with superhyperfine splitting due to the interaction with protons in platelike gypsum single crystals under X-ray irradiation have been analyzed at 25°C. Dehydrated regions with a radius  $>4$  Å are revealed in gypsum. The ESR spectra of  $\text{SO}_3^-$  radical ions and atomic hydrogen with  $\Delta H \approx 0.3$  G are found in the products of isothermal annealing of gypsum kept for 30 min after X-ray irradiation at 25°C. The dependences of the intensities of these spectra on the annealing temperature are studied in the range of 100-450°C. The temperature range of formation of  $\alpha$ - and  $\beta$ -phase states of bassanite and  $\gamma$ -anhydrite are determined. The process of residual water redistribution between the channel systems of the  $\alpha$ - and  $\beta$ -phase types of  $\gamma$ - $\text{CaSO}_4$  in gypsum thermal derivatives is established. © 2014 Pleiades Publishing, Inc.

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