



Mineral composition of the products formed during SO₂ sorption with application of limestone sorbent rich in magnesium

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Mineralna sestava produktov nastalih pri sorbciji SO₂ pri uporabi apnenca bogatega z magnezijem

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Abstract

The results of study of the product obtained during laboratory tests of SO₂ sorption using as a sorbent limestone with higher content of magnesium were presented in this article. The samples of limestone sorbent with varying magnesium content were collected in the area of Opole Silesia. Differentiation of magnesium amount in limestone samples was connected with presence of carbonate phases varied in magnesium content: low Mg-calcite, high Mg-calcite, dolomite and huntite. The samples of an after sorption product were studied using analyses: macroscopic description, microscopic analysis with application of the microscope with polarized transmitted light, X-ray diffractometry and thermal analysis. The samples showed a variation in color (usually from white to beige). A darker color was connected with the presence of iron minerals. Their texture was fine-grained (pelitic). Four main mineral phases were identified in the studied samples: anhydrite, portlandite, calcite and calcium oxide. Moreover a little amount of quartz grains were observed. Minerals like gypsum, epsomite, kieserite and periclase were not found in the studied samples despite the presence of magnesium in sorbent samples. The result of researches show that during the tests of the SO₂ sorption with limestone sorbent application not the entire contents of sulfur dioxide was conjuncted by the grains of carbonate sorbent.

Key words: mineral composition, SO₂ sorption, sorbent.

Povzetek

V članku so predstavljeni rezultati laboratorijske preiskave produktov sorbcije SO₂, pri uporabi sorbenta apnenca z visoko vsebnostjo magnezija. Vzorci sorbenta apnenca z različnimi vsebnostmi magnezija so bili zbrani na območju Opole Šlezije. Različna količina magnezija v vzorcih apnenca je v povezavi z prisotnostjo karbonatne faze in se spreminja z vsebnostjo: nizkim deležem Mg-Ca, visokim deležem Mg-Ca, dolomitom in huntitom. Na vzorcih produktov sorbcije so bile izvedene naslednje raziskave: makroskopski opis, mikroskopska analiza z uporabo mikroskopa s polarizirano svetlobo, X-ray difraktometrija in termalna analiza. Na vzorcih je opaziti različno obarvanost (praviloma od bele do sivkasto rjave barve). Temnejša obarvanost vzorcev je povezana s prisotnostjo železovih mineralov. Tekstura vzorcev je fino znata (pelitska). V preiskanih vzorcih so bile zaznane štiri prevladujoče mineralne faze: anhidritna, portlanditna, kalcitna in kalcijev oksidna. Nadalje je bila zaznana manjša količina kremenovih zrn. Minerali kot so sadra, epsomit, kieserit in periklas niso bili zaznani v opazovanih vzorcih kljub prisotnosti magnezija v vzorcih

sorbenta. Rezultati raziskave kažejo, da v času sorbcije SO_2 z sorbentom apnencem, celotna količina žveplovega dioksida ni v kontaktu z zrni karbonatnega sorbenta.

Ključne besede: mineralna sestava, sorbcija SO_2 , sorbent.