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様　式　Ｃ－１９、Ｆ－１９－１、Ｚ－１９　（共通）

科学研究費助成事業　　研究成果報告書

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機関番号：１２６０４

研究種目：基盤研究(C)（一般）

研究期間：2016～2018

課題番号：１６Ｋ０５３９４

研究課題名（和文）ポジトロニウムを用いた硫酸酸性環境中の硫酸塩ナノ鉱物形成機構の微視的研究

研究課題名（英文）Microscopic studies of anglesite formation under sulfuric acid condition using positronium

研究代表者

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交付決定額（研究期間全体）：（直接経費）　　3,600,000円

研究成果の概要（和文）：硫酸酸性環境下で方塩鉱から硫酸塩ナノ鉱物が生成するメカニズムを，電解放射型走査電子顕微鏡（FE-SEM）観察，X線回折（XRD）実験，そして一連の陽電子消滅実験により調べた。方鉛鉱表面またはマイクロクラック表面に硫酸鉛鉱ナノ結晶生成が起こると，それらの粒界には近傍に硫黄が濃化したナノボイドが見出された。硫酸酸性環境下で硫酸鉛鉱の生成が進むと，粒界のナノボイド濃度が増加することがわかった。

研究成果の学術的意義や社会的意義
本研究で得られた結果は，硫酸酸性環境中の硫酸塩ナノ鉱物形成に粒界中のナノボイドが関与していることを示唆しており，このことは学術的に意義がある。さらなるデータの蓄積により，硫酸酸性環境下で硫酸塩ナノ鉱物形成メカニズムを説明するモデルの構築が期待される。実現すれば，環境への鉛溶出抑制技術に貢献するだけでなく，地質環境中の物質移行モデルの高精度化にも結びつくため，社会的貢献度も高い。

研究成果の概要（英文）：The formation mechanism of anglesite from galena under sulfuric acid condition was investigated by field emission scanning electron microscopy (FE-SEM), X-ray diffraction (XRD), and a series of positron annihilation experiments. Nanovoids dominantly surrounded by surfer atoms were found in grain boundaries among galena and anglesite nanocrystals upon the formation of anglesite nanocrystals. The concentration of nanovoid increases with increasing the degree of anglesite formation.

研究分野：鉱床学

キーワード：硫酸鉛鉱　方鉛鉱　硫酸酸性環境

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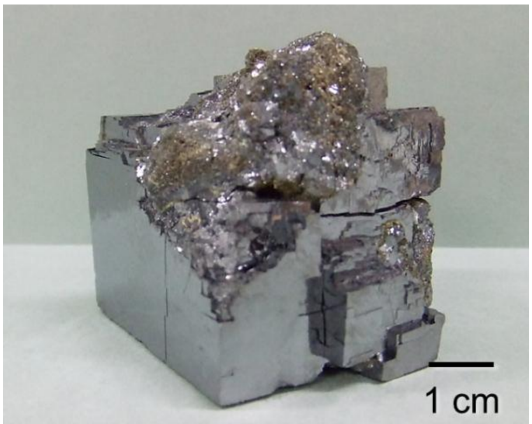

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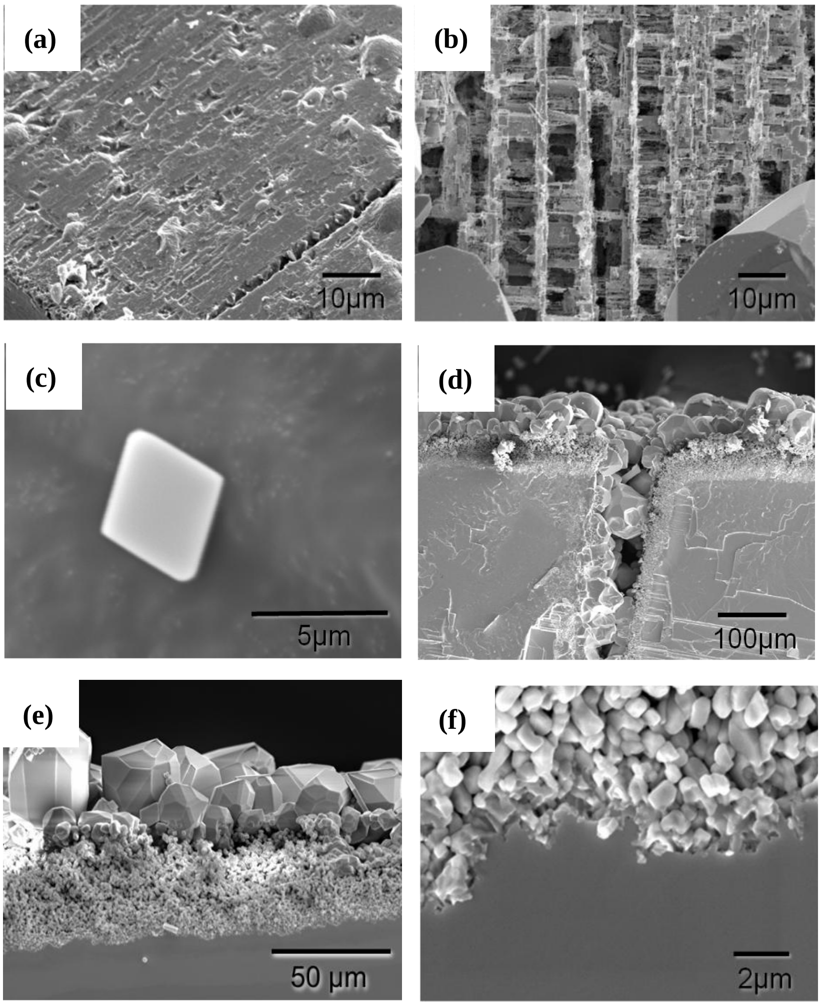

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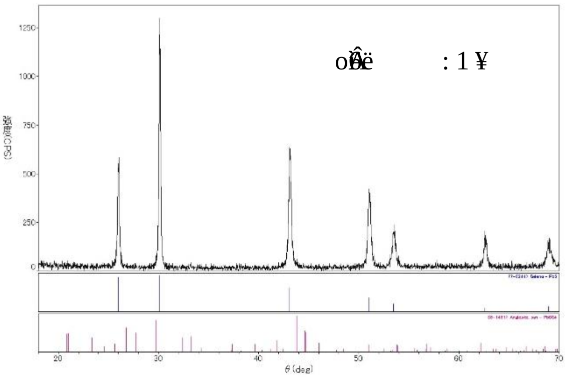

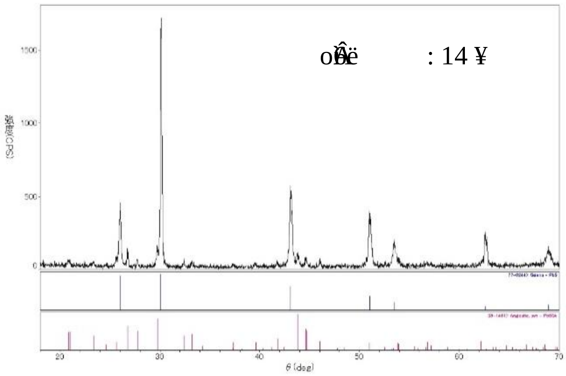

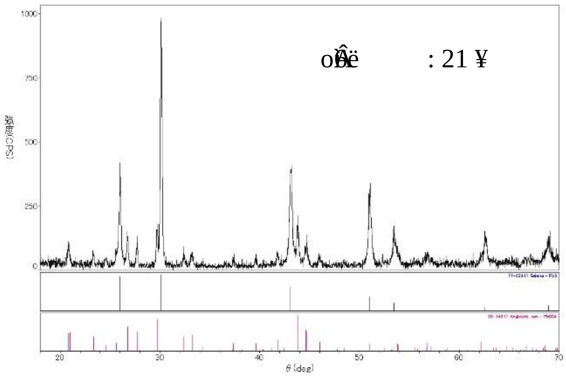

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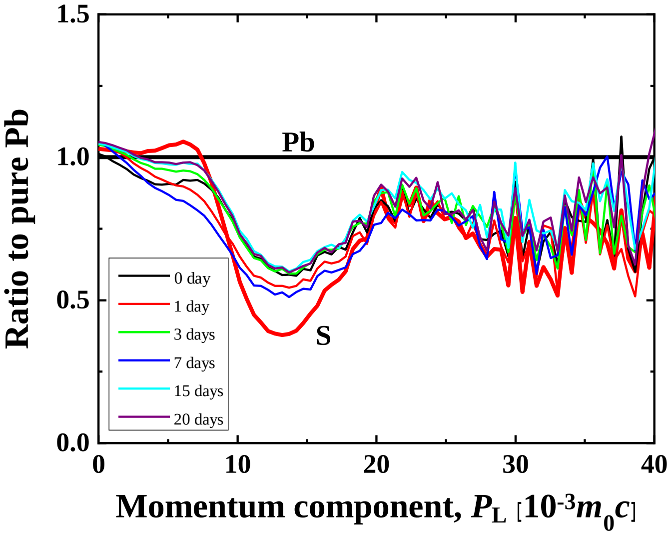

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