

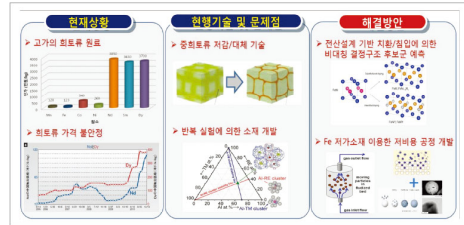
비희토류 Fe 계 자석소재 기술

Rare-earth Free Fe-based Permanent Magnet Materials

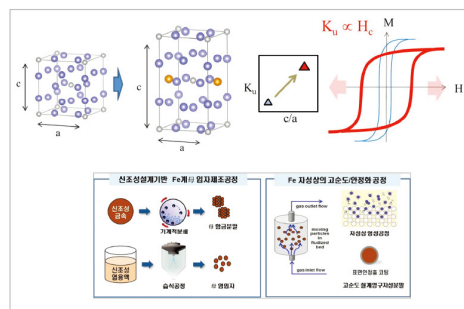
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기술내용

- 희토류계 영구자석소재 수요급증 및 지속적인 자원수급 문제를 해결하기 위한 비희토류 Fe 계 영구자석소재 기술
- Fe 계 소재의 고보자력화를 위한 비대칭결정구조제어기술
- 계산재료과학 기반 조성 설계 및 공정실현 기술

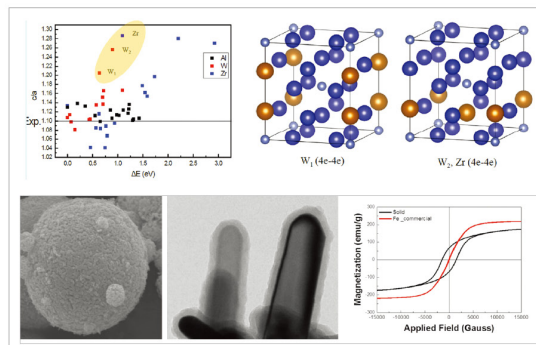


- 계산 기반 경량 및 전이금속의 치환/침입 조성 설계
- Fe-X 계 자성분말의 고순도화를 위한 제조공정기술 개발
- Fe 계 자성분말의 입도 및 형상 조절을 통한 보자력 증진기술 개발
- 치환/침입 공정의 효율 증진 공정기술 개발
- 표면안정층 코팅기술 통한 대기안정성 확보



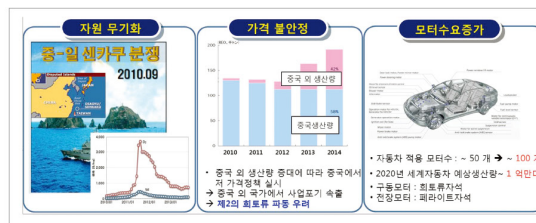
우수성

- 보자력 1000% 증진가능한 전산설계기반 조성 확보
 - 전이금속의 치환/침입 용이한 Fe 계 자성분말 습식제조기술 확보
 - N 침입 공정 효율증진 가능한 Fe 계 자성분말 구조 확보
 - Fe 계 자성분말의 입도 및 형상 조절을 통한 보자력 증진
 - 대기안정성 증진된 표면안정층 코팅공정 확보
- [특허] KR10-2016-0140872 Fe계 질화물 자성 분말 및 이의 제조방법



사업성

- 희토류 자원의 자급분가 및 가격변동 등의 장애요인 해결가능
- 친환경자동차 수요 증가 (2020년 세계자동차예상생산량 ~ 1억만대)로 인한 모터 수요 증가로 인한 비희토류계 자석소재 수요 증진
- 고품성 본드자석소재 적용가능 (2018년 세계시장규모 ~ 6조원)
- 개발된 원천기술은 친환경 자동차 뿐 아니라 로봇, 의료 및 가전 분야 등에 활용 가능

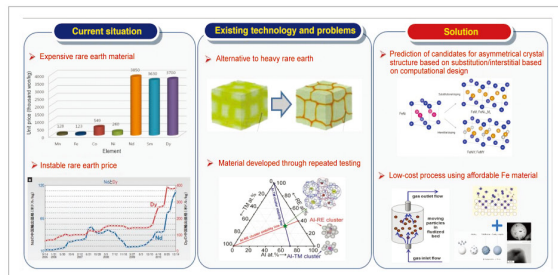


Rare-earth Free, Fe-based Permanent Magnet Materials

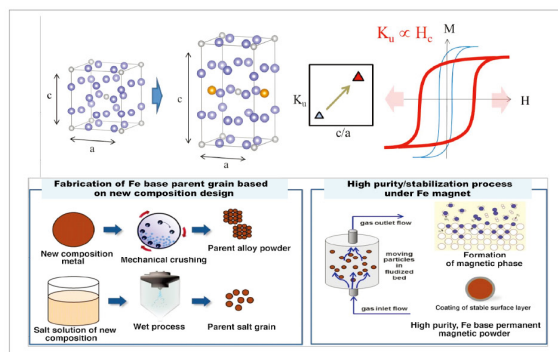
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Technology Overview

- Development of rare-earth free Fe based permanent magnetic materials to solve rapid increase in demand of rare-earth materials and their demand and supply issues
- Technology to control non-centrosymmetric crystal structure to enhance the coercivity of Fe based magnetic materials
- Composition design based on computational materials science and realization of fabrication process

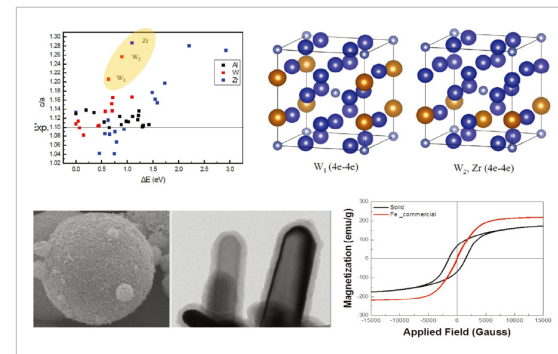


- Designing of substitution/interstitial composition for light weight and transitional metal based on computation science
- Fabrication Process of Fe-X magnetic powder with high purity
- Development of techniques to enhance coercivity via the control of particle size and shape of Fe base magnetic powder
- Techniques to enhance the efficiency of substitution/interstitial process
- Securing high air stability of magnetic powders via coating technology of surface protective shell



Highlights and Strengths

- Securing of alloy composition with 1000 percent increase of coercivity via computational design
- Wet chemical fabrication of easy substitution/interstitial introduction of transitional metal element
- Securing of Fe based magnetic powder with higher efficiency of nitrogen interstitial introduction
- Enhancement of coercivity through adjustment of particle size and shape of Fe base magnetic powder
- Securing the coating process for high stability of magnetic properties in air
- [Patent] KR10-2016-0140872 AN MAGNETIC POWDER OF IRONNITRIDE AND A METHOD OF PRODUCING OF THE SAME



Business Cases

- Higher availability of rare earth, protection from price fluctuations
- Greater demand for rare-earth free magnet materials due to growing global demand for vehicles running on non-fossil fuel
- Bond magnet with high magnetic properties (global robot market: 6 trillion won by 2018)
- Applicable to various areas such as robots, medical, consumer electronics as well as electric automobiles

