

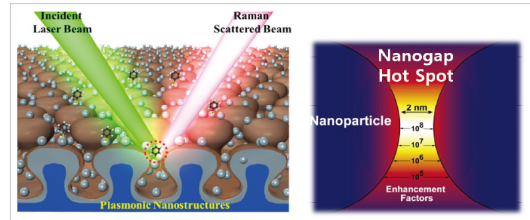
은 나노선 기반 분자감지 기판소재

3D Ag Nanowires-Based SERS Substrates

TRL5

기술내용

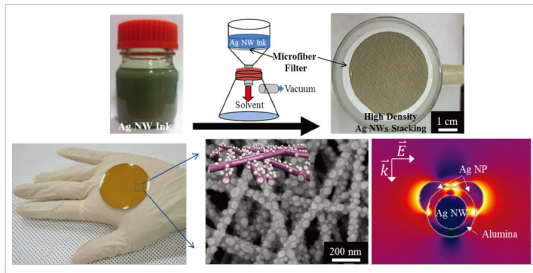
- 표면플라즈몬공명(LSPR)현상을 발생시키는 초고밀도 나노갭 기판소재 기술
- 나노갭(핫스팟)에 존재하는 분자의 라만신호를 수백만배 증폭하여 ppb이하 극미량의 화학성분 분석 가능
- 현장진단용 초고감도 환경센서, 유해화학물 측정센서, 바이오 센서에 활용



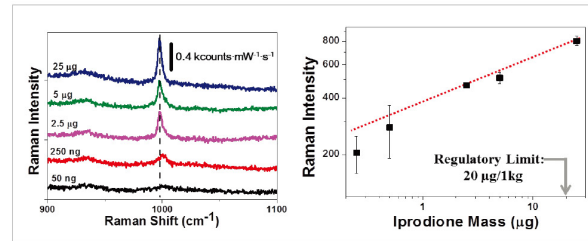
Surface-Enhanced Raman Scattering (SERS) 현상

은나노선 SERS기판소재

- 은나노선 잉크용액 진공여과 방식의 손쉬운 공정
- 계면 코팅 및 나노입자 데크레이션 기술 도입
- ppb 수준의 초고감도 SERS 소재 개발 (검출한계: 4.8 ppb)



잔류 농약 허용치 100배 민감도 분석가능



우수성

- 비식각공정 기술 적용 저가형 고효율 SERS기판 생산
- 대면적 비표지 방식 색 변환 센서 가능
- 분자 포집 및 필터링 기술 접목을 통한 실용성 확보
- 논문(Adv. Mater.) 게재 및 국내 특허 등록 ⇒ 미국출원

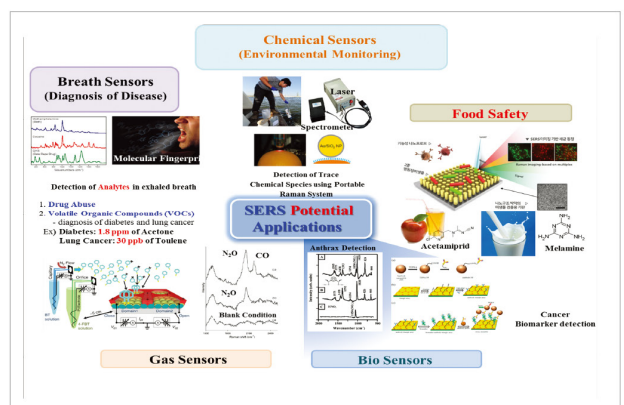


• [특허] KR10-1545989 표면증강 라만 분광용 기판, 이의 제조방법 및 이를 이용한 분석방법

사업성

활용분야

- 초고감도 대기 환경센서 및 날숨 센서
- 농약, 환경호르몬 등의 유해물 감지 센서
- 바이러스/세균 직접 검출 센서
- 환경 및 식품안전 현장진단 시스템 확립
- 질병 및 인체유해인자 조기진단 서비스



3D Ag Nanowires-Based SERS Substrates

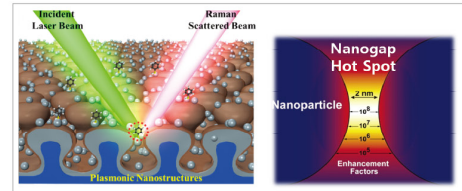
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Technology Overview

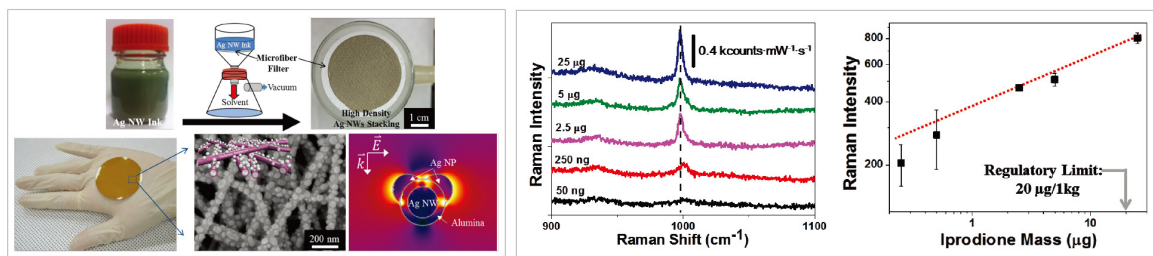
- Ultrahigh nano-gap substrates generating localized surface plasmon resonance (LSPR)
- Analyzing trace of chemicals (at ppb level) by amplifying the Raman signal existent in the nano-gap (hot spot)
- Applicable to highly sensitive environmental sensors and those detecting harmful chemicals for site diagnosis

Ag nanowire SERS substrates

- Easy process based on vacuum filtering of Ag nanowire ink solution
- Interface coating and nano particle decoration
- Highly sensitive SERS substrates at ppb level (limit of detection: 4.8 ppb)



Surface-enhanced Raman scattering (SERS)



Capable of detecting residual pesticides with x100 sensitivity

Highlights and Strengths

- Affordable, highly efficient SERS substrates based on non-etching process
- Color switching sensors of large-area, non-labelling type
- High practicality by leveraging molecule capture and filtering
- Published in journal (Adv. Mater.) and patented in Korea and ⇒ patent applied for in the U.S.



• [Patent] KR10-1545989 SUBSTRATE FOR SURFACED ENHANCED RAMAN SCATTERING, FABRICATING METHOD FOR THE SAME AND ANALYZING METHOD USING THE SAME

Business Cases

Applicable products

- Highly sensitive air environmental and exhaled breath sensors
- Sensors detecting harmful substances (i.e. pesticides, environmental hormones)
- Sensors detecting virus/bacteria directly

Applicable services

- Site diagnosis for environment and food safety
- Early diagnosis of diseases and harmful factors for human bodies

