

제 65회

ORGAN ON A CHIP

기술교류회

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한림대학교 SmartLEAD 온라인 강연



남기태 교수

서울대학교 재료공학부

1. Education

박사: Massachusetts Institute of Technology 재료공학 (2007)

석사: 서울대학교 재료공학부 (2002)

학사: 서울대학교 재료공학부 (2000)

2. Experience

2017 ~ 현재

서울대학교 SOFT Foundry, Director

2010 ~ 현재

서울대학교 재료공학부, 교수

제목

카이럴 플라즈모닉 나노파티클의 바이오센서 응용 Chiral Plasmonic Nanoparticles for Biosensor

초록

Chiral structure controlled at nanoscale provides a new route to achieve intriguing optical properties such as polarization control and negative refractive index. However, asymmetric structure control with nanometer precision is difficult to accomplish due to limited resolution and complex processes of conventional methods. In this regards, utilizing chirality transfer occurring at organic-inorganic materials offers viable route to overcome these limitations. Previously we developed a unique synthesis strategy that characteristic of molecule is transferred to gold nanoparticle morphology. Based on the system, here, we demonstrated novel chiral gold nanostructures exploiting chirality transfer between peptide and high-Miller-index gold surfaces. Enantioselective adsorption of peptides results in unequal development of nanoparticle surface and this asymmetric evolution leads to highly twisted chiral element in single nanoparticle making unprecedented 432 helicoid morphology. The synthesized helicoid nanoparticle showed strong optical activity (dissymmetry factor of 0.2 at 622 nm) which was substantiated by distinct transmittance color change of helicoid solution under polarized light. Modulation of peptide recognition and crystal growth enabled diverse morphological evolution and the structural alterations provided tailored optical response, such as optical activity, handedness, and resonance wavelength. We believe that our peptide directed synthesis strategy offers a truly new paradigm in chiral metamaterial fabrication and will be beneficial in the rational design of chiral nanostructures for use in novel applications.

주 관 한림대학교 미래융합스쿨 융합신소재공학전공, 융합신소재공학연구소

후 원 한국연구재단 중견연구사업, 산업통상자원부 3D 생체조직칩 제품화사업

지 원 한림대학교 대학원 나노-메디컬 디바이스 공학 협동과정, 춘천바이오산업진흥원

문의처: de3553@hallym.ac.kr / Tel: 033-248-3553