


課題番号 : F-17-OS-0015
 利用形態 : 機器利用
 利用課題名(日本語) : 表面増強ラマン散乱計測に用いる金属ナノ粒子表面のナノ計測
 Program Title (English) : Morphology Imaging of Metal Nanoparticles for SERS Measurement
 利用者名(日本語) : 張志強^{1,2)}、畔堂一樹^{1,2)}、齊藤広大^{1,2)}、藤田克昌¹⁾
 Username (English) : Z. Zhang^{1,2)}, K. Bando^{1,2)}, K. Saitoh^{1,2)}, K. Fujita¹⁾
 所属名(日本語) : 1)大阪大学大学院工学研究科、2)有限会社セレンディップ研究所
 Affiliation (English) : 1)Dep. of Applied Physics, Osaka University、2) Serendip Research, Ltd.
 キーワード/Keyword : SEM 微細加工 構造解析 集束イオンビーム リソグラフィ・露光・描画装置

1. 概要(Summary)

We fabricated the metal nanostructures with the E-beam lithography technique. The structures were wedged structures such as . We expect that these wedged structures can be utilized for intracellular environmental measurement combining with surface enhanced Raman scattering.

2. 実験(Experimental)

【利用した主な装置】

electron beam lithography system (JSM6500F)

【実験方法】

An e-beam resist with a thickness of 120 nm was spin-coated on a silicon wafer. Then, nanotemplates of SiO₂ were fabricated by e-beam lithography. After the template fabrication, 40 nm gold nanoparticles were deposited to form the wedged nanostructures.

3. 結果と考察(Results and Discussion)

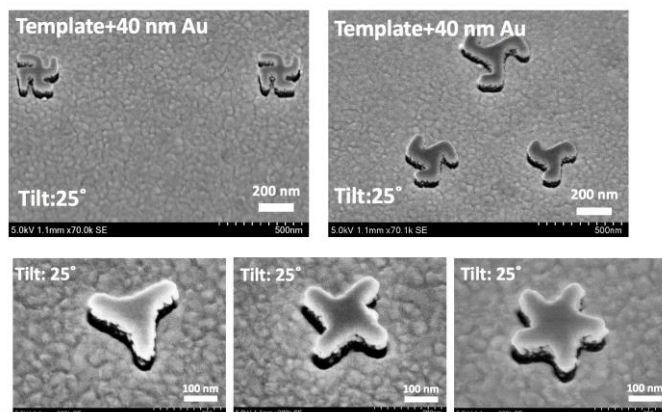


Fig. 1 SEM images of the fabricated structures. The scale bars are 200 nm (top) and 100 nm (bottom).

We fabricated several different Au nanostructures on SiO₂ nanotemplates with the e-beam lithography method. Fabrication of the structures were confirmed by SEM images (Fig. 1). The size of the structure is around 200-300 nm. We will investigate the optical property including Raman and Rayleigh scattering from the nanostructures and demonstrate the microscale measurement of intracellular measurement.

4. その他・特記事項(Others)

特別推進研究(26000011)

関連課題番号: F-15-OS-0051、F-16-OS-0027、

S-15-OS-0019、S-16-OS-0022、S-17-OS-0015

5. 論文・学会発表(Publication/Presentation)

(1) Zhiqiang Zhang, Kazuki Bando, Atsushi Taguchi, Kentaro Mochizuki, Kazuhisa Sato, Hidehiro Yasuda, Katsumasa Fujita, and Satoshi Kawata, "Au-Protected Ag Core/Satellite Nanoassemblies for Excellent Extra-/Intracellular SERS Activity," ACS Appl. Mater. Interfaces 2017, 9, 44027-44037.

(2) Zhiqiang Zhang, Kentaro Mochizuki, Kazuki Bando, Atsushi Taguchi, Katsumasa Fujita, Satoshi Kawata, "Quantitatively Evaluation of SERS Nanoparticles," The international symposium in 2017 "Raman spectroscopy for biomedical applications," in the annual meeting of The Spectroscopical Society of Japan (24 May 2017).

6. 関連特許(Patent)

なし