Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Facile design of plant oil infused fine surface asperity for transparent anti-fouling endoscope lens

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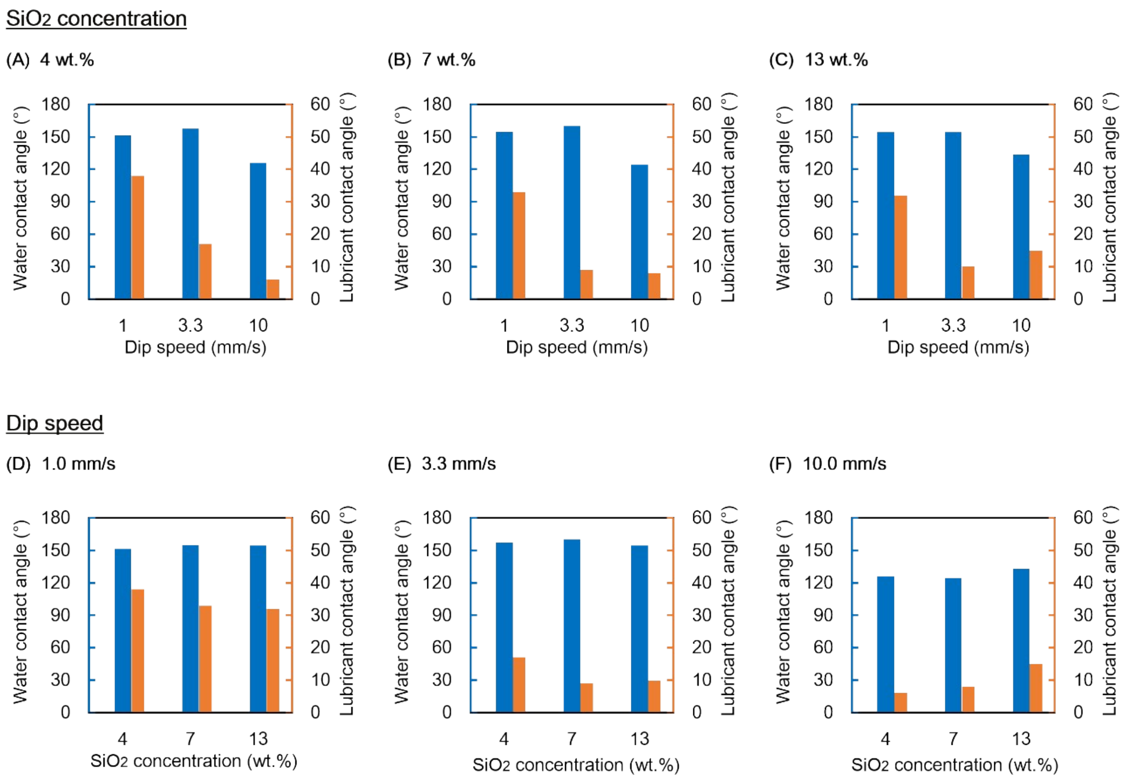

Fig. S1 Water (blue) and plant oil (orange) contact angles are shown. Each underlayer in (A), (B) or (C) is same concentration and difference dip speed. Each underlayer in (D), (E) or (F) is same dip speed and difference concentration.

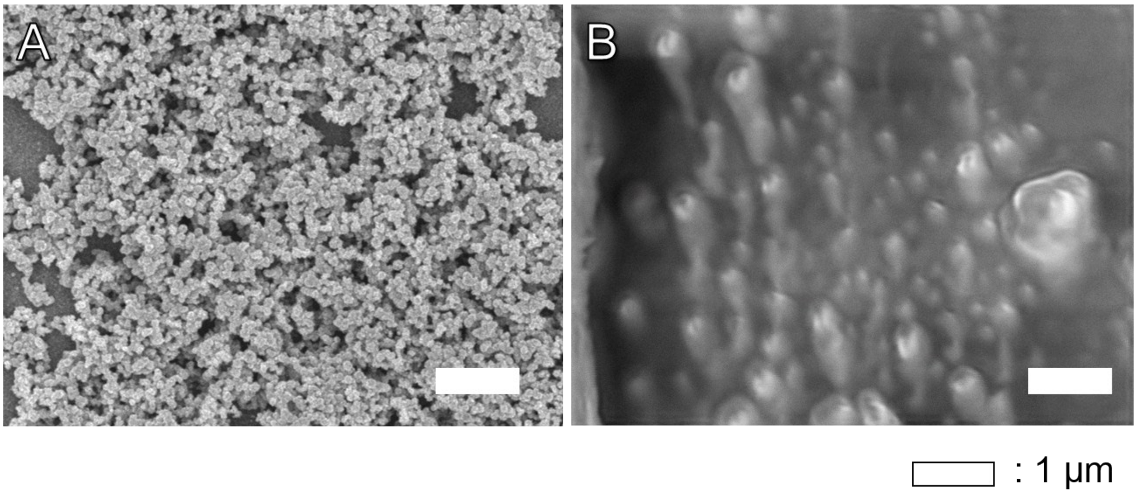

Fig. S2 SEM image of underlayer (A) and underlayer infused plant oil (B).

SLIPS were composed by under layer and lubricant. Under layer showed rough structure and scattering. But infusing plant oil made under layer flat and high transparent surface. It was caused by lubricant getting through under layer and covering. Figure S2 shows surface before and after infusing plant oil. On under layer, roughness structure of nanoparticles was observed clearly. On the other hand, roughness structure was not observed on infused sample. Thus, lubricant covered on under layer and top layer of SLIPS was lubricant. SLIPS enhanced flat surface and low scattering.

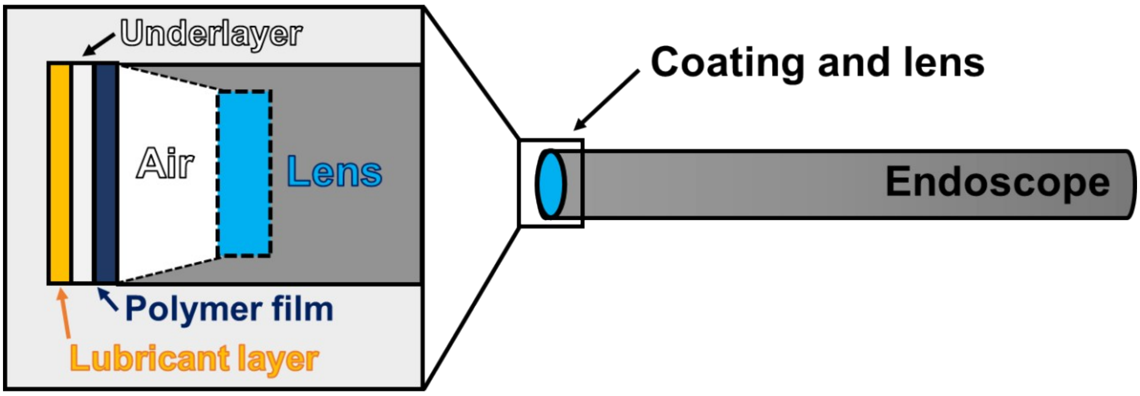

Fig. S3 Interfaces of coating endoscope. Polymer film with plant oil SLIPS covered endoscope lens.

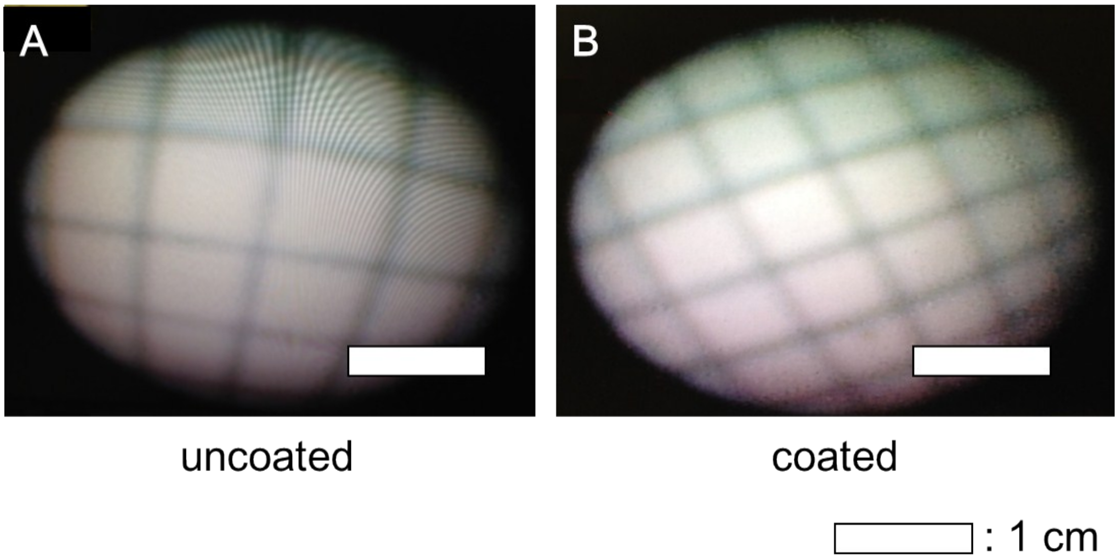

Fig. S4 Image thorough uncoated (A) and coated (B) endoscope.

In this study, we used SLIPS film when laparoscope experiment. SLIPS film were composed of nanoparticle layer (under layer) and lubricant layer. To confirm sight effect of SLIPS, we observed cross section thorough laparoscope covered SLIPS film. Figure S4 shows image thorough laparoscope. When comparing two images, though focal length became altered a little, distortions of black solid lines was not observed in the image through plant oil SLIPS coating. Consequently, plant oil SLIPS film didn't affect the sight through endoscope.

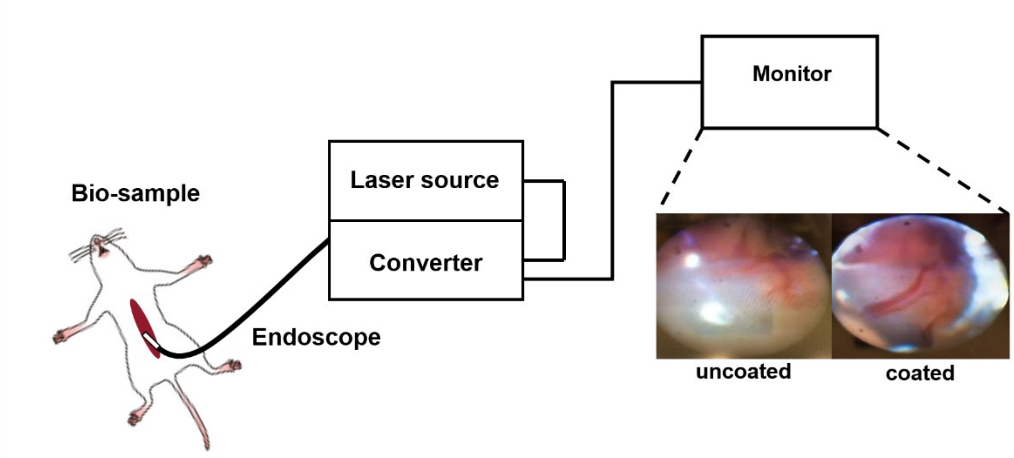

Fig. S5 Endoscope system including peripheral devices is illustrated. Outputted scope images were captured.

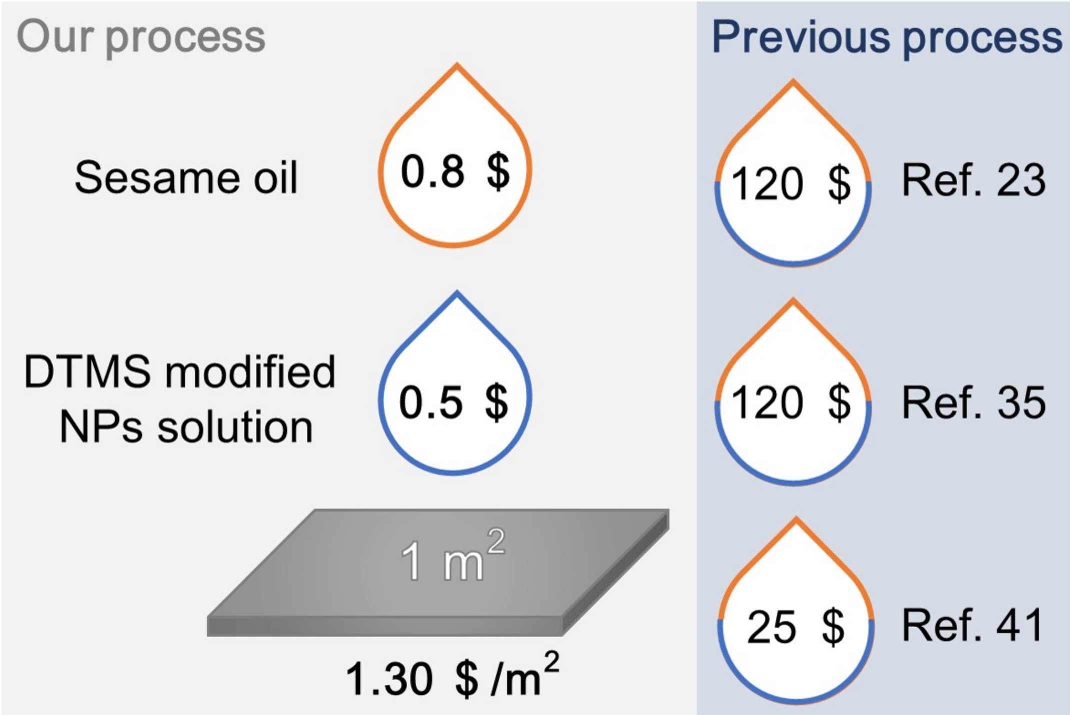

Fig. S6 Comparison of cost prepared various SLIPS per $1m^2$.

Cost of plant oil SLIPS is low compared with other SLIPS using fluorine material. It shows comparison of cost by various SLIPS prepared process. In our process, solution and sesame oil using as a lubricant costs 0.5 \$ and 0.8 \$ per 1 m^2. To use sesame oil leads low cost. For comparison, various costs of SLIPS included underlayer and lubricant were calculated.[23, 35, 41] Amount of lubricant were assumed as 0.1 L/m^2. On previous reports, fluorine materials were used and it costed so high. Cost of previous process took about 20-100 times compared with plant oil SLIPS.