

Transparent, micropatterned Au mesh coil for wireless power transfer between eyeglass/contact lens

Lunjie Hu,¹ Taiki Takamatsu,¹ Te Xiao,¹ Lu Chen¹, Takeo Miyake,¹

¹Graduation School of Information, Production and System, Waseda University, Japan

E-mail: hulunjie@akane.waseda.jp

Abstract:

Smart contact lenses are next-generation products that allow a lot more than just perfect vision. Previously, we developed wireless power transfer system between an eyeglass and a contact lens [1]. Our wireless-powered system consists of an in-parallel connection with a loop antenna inductor (L) and a miniaturized ceramic capacitor (C) for an eyeglass and a contact lens. It is designed for power transfer at a resonant frequency of 13.56 MHz. The frequency is an industrial science medical (ISM) band suitable for receiving power without energy loss when the antenna is positioned near an aqueous medium. This band is also suitable for designing a small loop antenna mounted on the contact lens. However, common metallic loop coil made by a wire (wire diameter: 0.1 mm and loop diameter: 12 mm) blocked a part of vision during eye movement. To resolve this vision blockage, we designed transparent gold loop antenna with photolithography and electroplating. The transparent antenna is a micro-patterned serpentine mesh in 10 μm width and 200 $\mu\text{m} \times 200 \mu\text{m}$ size. In the poster, we will explain more details about mechanical and transparent properties as well as wireless power transfer efficiency using micro-patterned serpentine mesh coils.

a

b

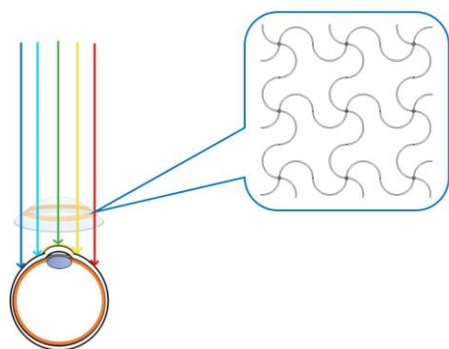


Figure 1 a. Schematic diagram of transparent gold film composed of precise mesh b. Transparent antenna and transparent mesh

REFERENCES

[1] T. Taiki, et.al, Advanced Materials Technologies, 4, 1800671 (2019).