Supplementary Information

Athermal Repair Nanoscale Defects in Optical Materials Using Femtosecond Laser

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1. **AFM images**

We have studied the structures of the femtosecond laser irradiated area of as-implanted fused silica using atomic force microscopy (AFM) after irradiated at different fluence. When the laser fluence is about 0.2 J/cm^2, the AFM images are shown in Figure S1. Compared to the image of those irradiated at the fluence of 0.5 J/cm^2 (Figure S2), we notice that there is no crater in the irradiated area, which means that no ablation effect happens, as preferred.

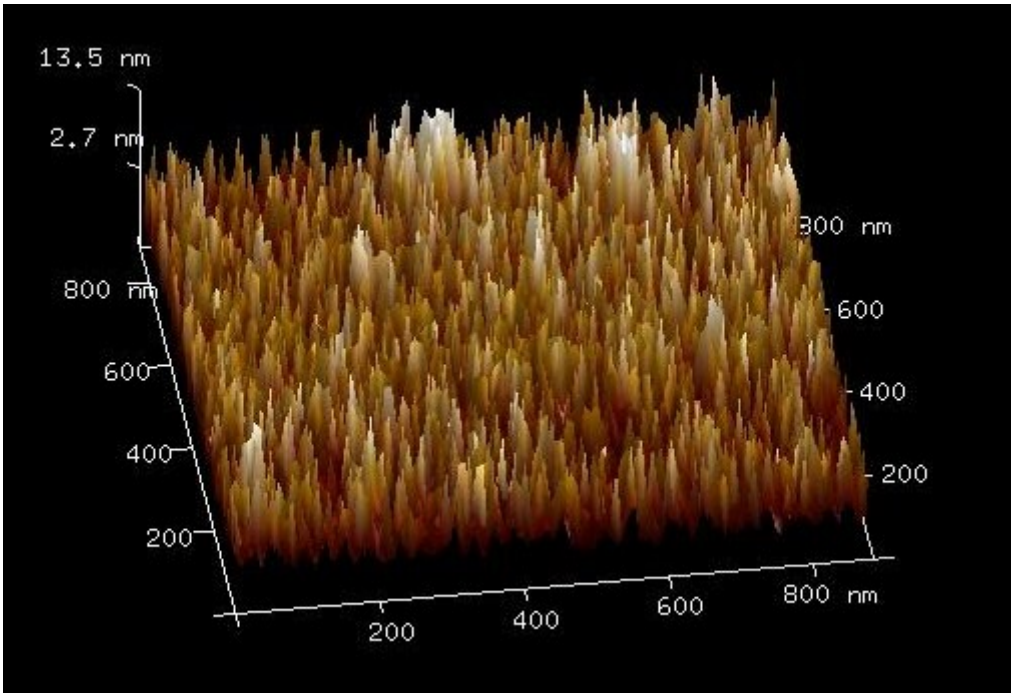

Figure S1. The AFM image of the femtosecond laser irradiated area of as-implanted fused silica. When the laser fluence is about 0.2 J/cm^2, there is no crater in the

irradiated area, which means that no ablation effect happens.

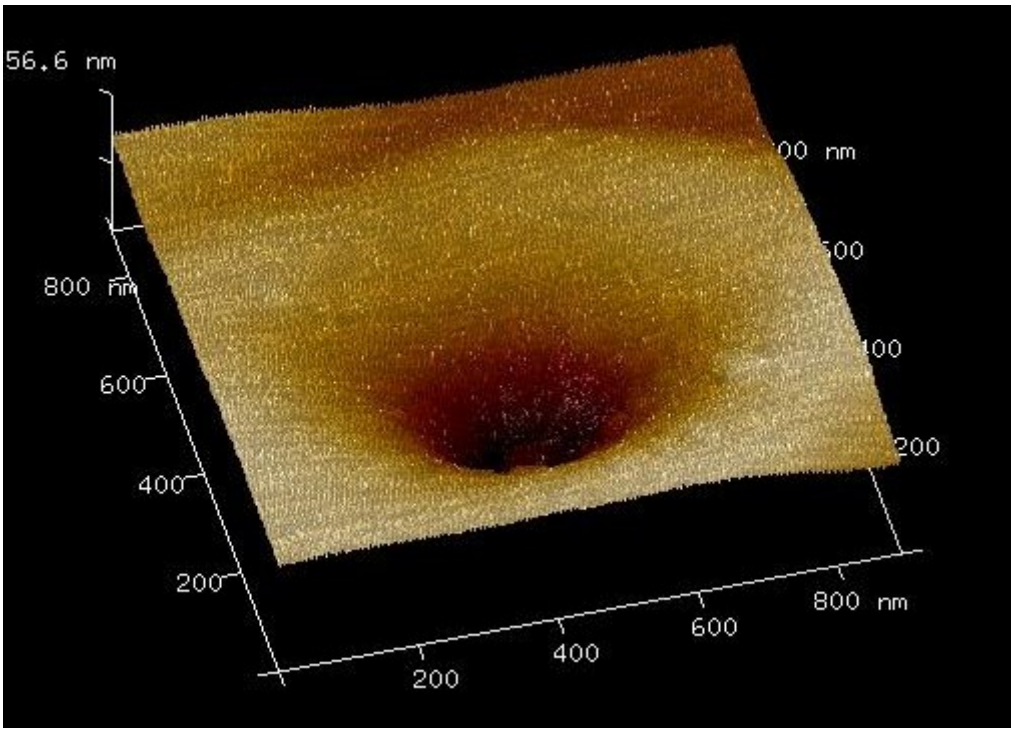

Figure S2. The AFM image of the femtosecond laser irradiated area of as-implanted fused silica. When the laser fluence is above 0.5 J/cm^2, there is a nanoscale crater in the irradiated area.