

DAMAGES AND SURFACE MODIFICATIONS ON BACTERIA *ESCHERICHIA COLI* CAUSED BY OXYGEN PLASMA

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ABSTRACT

Inductively coupled oxygen plasma was used to study degradation of *Escherichia coli*. Bacteria were deposited on a silicon wafer substrate and treated by plasma for different periods. The effect of oxygen plasma ions and neutral oxygen atoms was observed by Atomic Force Microscopy (AFM) and Scanning Electron Microscopy (SEM).

The first effect was etching of small protein structures outside the cell (fimbriae and flagella), which are efficient device for bacterial surface adhesion and motility. They oxidize in first few seconds. Next was removal of the envelope – a protective coating bacteria developed during growing. After removing the envelope (capsule), slow etching of the cell wall was observed. Further treatment resulted in gradual removal of the cell wall and after 240s, only ashes remained. Images of plasma interaction steps during bacteria degradation are presented and the plasma radical interaction steps explained by observed damages of bacteria.