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A Study on the effectiveness of atmospheric air plasma in sterilization on indium tin oxide

Abstract

Atmospheric air plasma is a cold plasma and its application is enhanced nowadays as an alternative to a sterile surface that cannot withstand high temperatures and chemical material. For instance, the consumption of smartphones among health workers in hospitals was said to be a cause that can spread pathogens to patients widely in the wards. Moreover, the smartphone consists of components that are sensitive to high temperatures and chemical materials that would give corrosion effects. The aims are to investigate the surface changes of indium tin oxide (ITO) after exposure to air plasma and to investigate the effectiveness of atmospheric air plasma by inactivating Escherichia coli (E-coli). The morphological test was conducted to study the surface changes of ITO using SEM. The microbiological test was conducted to examine the validity of the atmospheric air plasma in inactivating E-coli. The result revealed that 24V, 1L/min, 1.0mm copper thickness was capable of inactivating E-coli within 30 s without changing the ITO surface. However, more studies still need to be conducted in the future work for improving and get an accurate result in air plasma set-up for sterilization.

Keywords

Atmospheric Air Plasma; Dielectric Barrier Discharge; Morphological Changes