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Bactericidal properties of nanocrystalline

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 Collaboration**

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The following work intends to present the behavior of *P. Aeruginosa* on nanocrystalline diamond (NCD) surfaces. The exposure of these bacteria to microcrystalline diamond (MCD), stainless steel AISI 304 (SS), silver (Ag), polyethylene (Poly) and copper (Cu) is also included, with the sole purpose of comparing their efficiency with NCD's. The results show that the inhibitory properties of NCD become perceivable just after 13 hours of bacterial transference. NCD was shown to be a good bactericidal surface, overmatched only by copper. The polyethylene, silver, stainless steel and MCD were found to be less inhibiting than NCD. Valuable properties of NCD as the high resistance to oxidation and corrosion, the extreme mechanical hardness and the biological compatibility with blood and tissue makes it more useful than copper. In order to study the bactericidal properties of each surface, different characterization techniques were employed, such as scanning electron microscopy (SEM), atomic force microscopy (AFM), the measurement of the contact angle and the evaluation of the colonization factors via a statistical analysis of the bacterial count. These techniques helped to establish a correlation between the roughness, the hydrophobicity/hydrophilicity and the colonization susceptibility of the given materials.

Samples	Area occupied by bacteria (μm^2)	Average number of bacteria	Colonization factor (%)
NCD	121.63	66.83	24.95
MCD	283.37	93.83	58.12
Cu	0	0	0
Ag	372	129.62	76.30
SS	486.42	363	99.77
Poly	135.27	59.33	27.74