

Structural and Compositional Characterization of SilverFil Amalgam

Abstract

SilverFil (Silverfil dental Products, Malaysia) is another commercially available dental amalgam; however it is based on silver and mercury only. It is claimed that upon amalgamation, there is no excess mercury in SilverFil. Objectives: The objectives of this study were to determine the structural state and chemical composition of the starting materials and presence of mercury in the resulting amalgam. Methods: All the starting materials of SilverFil and the SilverFil amalgam specimens were characterized using Field Emission Scanning Electron Microscopy (FESEM-EDX), X-Ray Diffraction (XRD) and X-Ray Photoelectron Spectroscopy (XPS). Results: The FESEM images of the amalgam shows silver-mercury (Ag-Hg) clusters. The elemental mapping of SilverFil™ shows good distribution of Ag and Hg. The EDX analysis showed that all the chemical composition of the starting materials contain no and consist of only Ag and Hg. These results agreed concurred with the XRD analysis. The XRD analysis also revealed that the chemical composition of SilverFil is similar to naturally occurring mineral called “Moschellandsbergite”. The XPS analysis showed that there was no free mercury (Hg⁰) present in the starting material. When the resulting amalgam was analysed, the binding energy of Hg(4f) were 101.8eV and 100.6eV confirming the presence of bonded mercury to oxygen (HgO). Conclusion: It can be concluded that there was no free mercury present in SilverFil.

Authors:	RAMASINDARUM, C.; Abu Kasim N.H.
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