Thermoelectric Eddy Current in Dental Amalgams

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Hans Christian Oersted

"Dr. Seebeck has also succeeded in producing a thermelectric current in a single metal, but this succeeded only with metals that have a quite perceptible crystalline texture so that the various parts of a crystal then seem to play the role of different metals."

[1] New Experiments by Dr. Seebeck on Electromagnetic Effects, H. C. Oersted, 1823.*

(*Seebeck was only ever able to measure current by the deflection of a magnetised needle placed near to the surfaces of current carrying conductors)

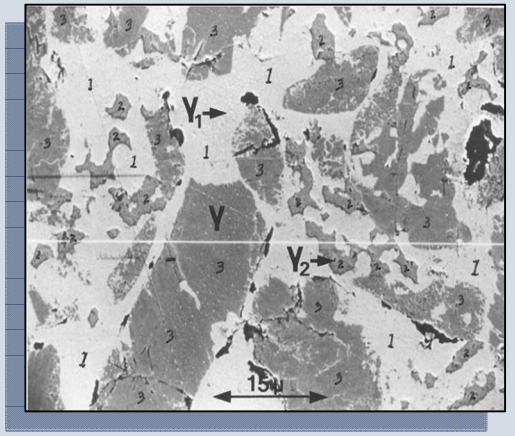
Proposal For An Experimental Investigation

It was first reported almost two hundred years ago that when a material which is known to consist of an inhomogeneous mixture of dissimilar electrical conductors is subjected to a temperature difference, an electromagnetic disturbance can be detected near the external surfaces of the material [1].

It is now considered that the explanation for this phenomenon is that when such a material is subjected to a temperature difference, the only way that it can maintain electrodynamic equilibrium is by the circulation of thermoelectric eddy currents at the interfaces of the regions of dissimilar composition within the material. These eddy currents continue to circulate for as long as the temperature difference is applied, and they in turn generate the electromagnetic disturbance which can be detected beyond the surface of the material.

Dental amalgam may be accurately described as an inhomogeneous mixture of dissimilar electrical conductors - much more inhomogeneous than any true alloy [2]. We can therefore legitimately propose an experimental investigation to determine whether any electromagnetic disturbance can be detected near the external surfaces of a sample of a typical dental amalgam when a temperature difference is applied across it.

In view of the fact that amalgam dental fillings are placed in children's teeth, we conclude that there is no rational scientific justification for dentists, thermoelectric scientists, or the general population at large to remain ignorant of the outcome of such an investigation.



Dental Amalgam

"The size of the particles can be estimated by the 15μ (micro-meter) line at the bottom of the photo. Darker shades represent phases of lower average atomic number. There are three phases present.

1. Matrix reaction phase (Ag_2Hg_3) (γ_1)
2. Reaction phase (Sn_8Hg) (γ_2)
3. Undissolved or unreacted (Ag_3Sn) (γ_3)

I have marked many of these three phases by the numbers 1, 2, 3."

[2] Professor D. B. Mahler, Oregon Health & Science University, private correspondence, December 2, 2003.