lattice of tin when solute atoms of very similar diameter are added. The structure can be derived by drawing the hexagonal structure in terms of an orthorhombic cell and by stacking three such unit cells on top of each other. The atoms of this structure lie on two inter-penetrating, body-centered, orthorhombic sublattices. If one sublattice is moved in the direction of the "a" axis by an amount "a"/4, a contraction along the "c" axis can occur, resulting in the tin type of structure. During this transformation, the (01.1) and (10.1) planes of the hexagonal structure become the (220) and (121) planes of the tetragonal structure. Since the Brillouin Zone of white tin is formed by the (220) and (121) planes,[10] the formation of γ_2 may be due to the tendency of these (220) and (121) planes to equalize their interplanar spacings when mercury is added resulting in a decrease in the electron atom ratio. At high pressure further change may occur.

CONCLUSION

Measurement of the elastic constants of the constituent alloys of dental amalgam has shown that the bulk, shear and Young's moduli of the γ_2-$HgSn_{7-8}$ phase are considerably lower than the elastic moduli of γ-Ag_3Sn and γ_1-Ag_2Hg_3. Consequently, the elastic response of dental amalgam to applied forces will be influenced by the presence of the γ_2 phase. These lower elastic moduli are produced by the weak intermetallic forces bonding the mercury and tin together contrasted to the stronger bonds formed in the γ and γ_1 structures.

The ultrasonic data suggests the possibility of high pressure, first order polymorphic transitions in γ and γ_2. These proposed transitions should be examined using high pressure x-ray diffraction techniques.