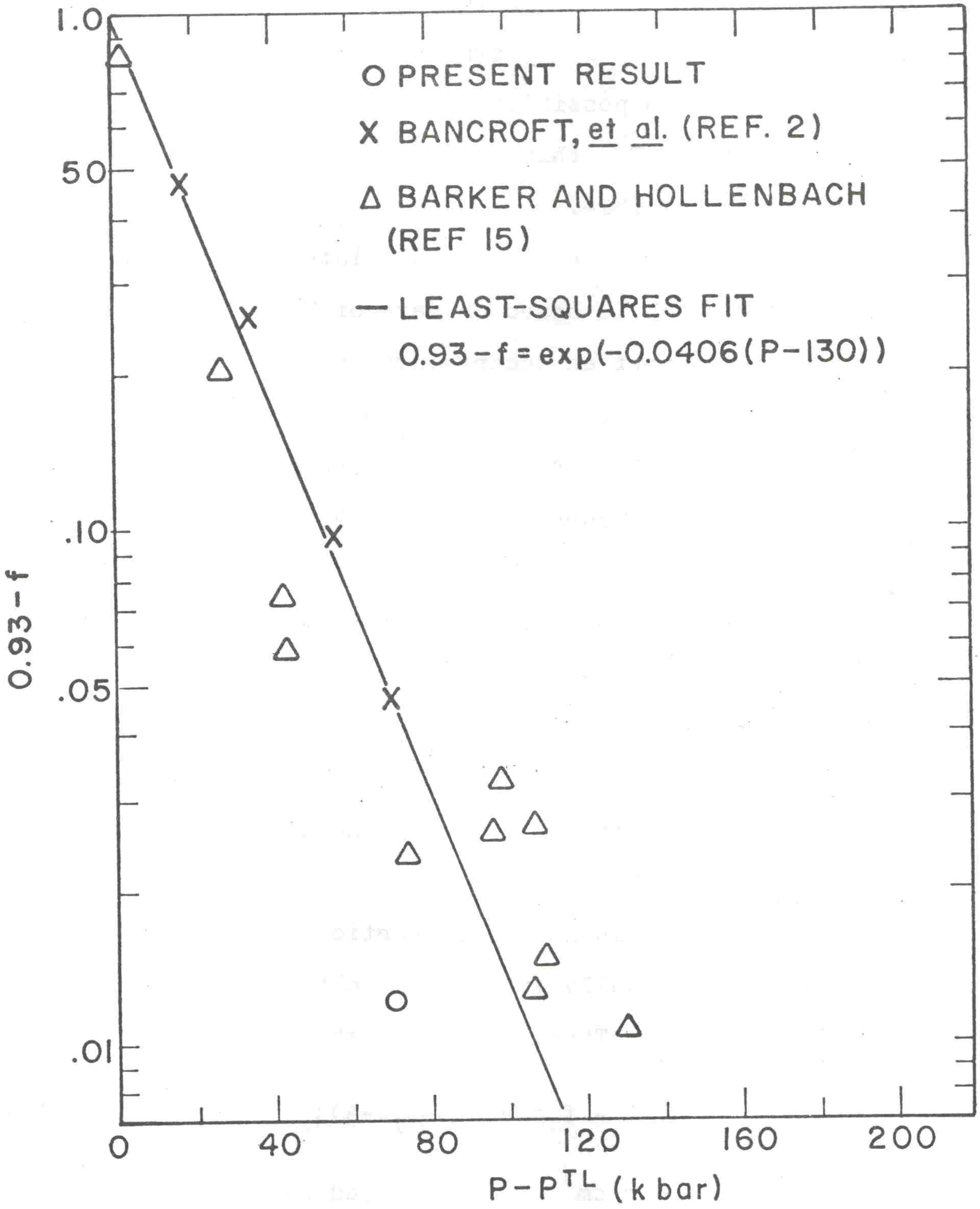

Fig. 5.7.--Amount of epsilon phase as a function of stress in excess of 130 kbar.

phase 2 boundary or to incomplete transformation for large values of $P - P^{TL}$. The data shown are insufficient to distinguish between these two possibilities, each of which is represented in Eq. (5.16). The third term on the right hand side of that equation is negligible.

The second phase surface is calculated from a two-phase equation of state which is based on data of Mao, et al.[33] (See Appendix A.) They report an uncertainty in initial volume for the second phase, V_{02}, of .0011 cm^3/gm. This uncertainty was reduced approximately 50 percent using a value of V_{02} consistent with x-ray measurements of V_2-V_1 made at stresses near 130 kbar and reported by Mao, et al.[33] The difference, V_2-V, obtained from this equation of state and measurements by Barker and Hollenbach[15] goes from 0.00056 to 0.0004 cm^3/gm for stresses from 204 to 304 kbar, which suggests that the second phase surface and the Barker and Hollenbach data agree within uncertainties of the experiments and accuracy of the equation of state for the second phase.

Since $P - P^{TL}$ is nearly proportional to G_{21} for iron (see Appendix A), an equally good fit is obtained by plotting $\ln(.93-f)$ versus G_{21}. The equation of the line so obtained is

$$0.93 - f = \exp[\theta(G_{21}-A)] , \qquad (5.17)$$

where $\theta = 6{,}444$ gm/Mbar cm^3 is determined by least squares, and $A = 8.7 \times 10^{-5}$ Mbar cm^3/gm is G_{21} at the transformation state (P^{TL},T^{TL}). The differential of Eq. (5.17) is