Let us use Eq. (11) to calculate the relative defect concentration of W3N and MRC silver foils using hypothetical values of relaxation times and stress levels which are consistent with our assumptions. Let material 1 be the more pure W3N and material 2 be MRC silver. In accordance with our assumptions the following statements will hold:

1. Material 1 will have longer relaxation times than material 2.
2. At x' (Fig. 16 (a)) material 1 will have a larger value of σ_I and a smaller value of σ_F than material 2 (Fig. 16 (c)).

For simplicity, let $s = \tau$. Let $\tau_1 = 2\tau_2$, $\sigma_{F1} = 1.8$ kbar and $\sigma_{F2} = 3$ kbar in proportion to impurity concentration in the foils, and let $\sigma_{I1} = 7$ kbar and $\sigma_{I2} = 4.5$ kbar in accordance with their prescribed elastic precursor decay rates. (Keep in mind two processes: (1) peak elastic stress on the wave front decays as the wave propagates through the foil; (2) at a given material point the elastic stress decays in time until steady state is reached.) For any common final strain value

$$\epsilon_F = \ell n(V/V_o),$$

at $x = x'$ we find

$$\frac{\chi_{pd}(1)}{\chi_{pd}(2)} = 1.17 \quad ;$$

the more pure silver has higher defect concentration in agreement with the experimental results. Higher values of σ_I increase the ratio. To compare to experiment, the ratio would need to be averaged over the foil thickness.

The model predicts the ratios of defect concentrations for different purities to be independent of final strain. Inspection of Fig. 11 shows that this agrees very well with experimental results; assuming proportionality between defect concentration and deviation resistivity, we find in the range 20 to 120 kbar

$$\frac{x_{pd}(W3N)}{x_{pd}(MRC)} = 1.64 \pm 0.05$$

from the curves fitted to the data. This constant ratio then is partial confirmation of the model. However, any model which predicts defect concentration proportional to the same power of strain for all purities will give the same result.

To recapitulate, the fundamental model assumptions are the following:

1. Elastic stress decays with distance of wave propagation and with time at a material point.

2. The more pure material has the lower elastic stress decay rate.

3. A Saada-type relation for defect production; defect concentration generated is approximately proportional to the work of plastic deformation.

The model is admittedly speculative and can only be tested by more experimentation.

It should be noted that if significant stress relaxation is actually present in the experiments, then equation of state calculations used to find P-V-T states will not be entirely correct. The equation of state analysis assumed steady state conditions in the shock process. The greatest correction would probably be on temperature calculations.