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Erratum: "Elastic-plastic shock wave profiles in oriented single crystals of cyclotrimethylene trinitramine (RDX) at 2.25 GPa" [J. Appl. Phys. 100, 024908 (2006)]

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In analyzing a new data set, we have discovered an error in data analysis that affects the results presented in our paper with the title above systematically.[1] Through an error in combining calibrated velocity per fringe constants for the etalons used in the velocity interferometry for any reflector (VISAR) measurement with locally developed analysis software, the window correction for the LiF windows was applied twice. This error affects the presented interface velocity profiles, and the subsequently calculated in-material particle velocities and longitudinal elastic stresses.

Interface velocity profiles with corrected particle velocities are given as a replacement to the original Fig. 2. Table II is provided complete with corrected in-material particle velocity and longitudinal stress values along with all other values, which remain the same. Additionally, corrected plots of the elastic precursor decay and Hugoniot are presented in Figs. 3, 4, and 5. The peak pressure for the experiments was approximately 3 GPa, rather than 2.25 GPa as given in the original title.

We sincerely regret the error, but note that the change in values does not affect the conclusions of this or any subsequent papers. This peak stress value is still well below the known 4 GPa phase transition in RDX observed in static and shock loading experiments. It is necessary to discuss further one citing article, in particular.[2] In this paper, a molecular dynamics simulation prediction of mechanism change is compared with the results presented and a newer, as yet unpublished data series at one GPa peak stress. The simulations suggest that there is a mechanism change in the form of anomalous hardening that is consistent with the change observed in the Hugoniot elastic limit between the series of experiments conducted at the two different stresses. The correction given here simply implies that the range of stresses between which the mechanism change occurs is one and three GPa; thus the conclusions of the citing paper are not affected.

TABLE II. Summary of shot data. Elastic and plastic data is denoted by "el" and "pl." (Length in mm, time in μs, velocities in mm/μs, pressure in GPa.) For Shot 1309, an elastic wave was not discernable, so the elastic and plastic wave speeds were both determined by the same arrival time, and the elastic RDX material state was not calculated.

Shot	Orientation	Thickness (mm)	Flyer Vel	u_{int} el	u_{int} pl	U el	u el	σ el	V el	U pl	u pl	σ pl	V pl	Plastic rise
1303	(210)	0.818	0.638	0.059	0.283	4.45	0.080	0.64	0.982	3.68	0.451	3.00	0.877	0.025
1302	(210)	1.483	0.630	0.048	0.279	4.03	0.070	0.51	0.983	3.49	0.461	2.91	0.868	0.030
1304	(210)	2.083	0.632	0.039	0.282	4.07	0.056	0.41	0.986	3.61	0.457	2.98	0.873	0.039
1309	(111)	0.902	0.638	…	0.278	3.28	…	…	…	3.28	0.481	2.85	0.853	0.020
1310	(111)	1.450	0.639	0.056	0.280	3.75	0.085	0.58	0.977	3.57	0.457	2.94	0.872	0.020
1311	(111)	2.019	0.633	0.053	0.277	3.64	0.082	0.54	0.978	3.50	0.458	2.89	0.869	0.020
1308	(100)	0.904	0.631	0.075	0.275	4.32	0.104	0.81	0.976	3.69	0.438	2.92	0.881	0.050
1305	(100)	1.321	0.639	0.072	0.280	4.54	0.097	0.79	0.979	4.01	0.421	3.06	0.895	0.046
1306	(100)	2.098	0.633	0.047	0.276	4.19	0.067	0.50	0.984	3.58	0.449	2.90	0.875	0.045
1312	(100)	2.789	0.636	0.035	0.279	4.20	0.050	0.38	0.988	3.73	0.441	2.97	0.882	0.126

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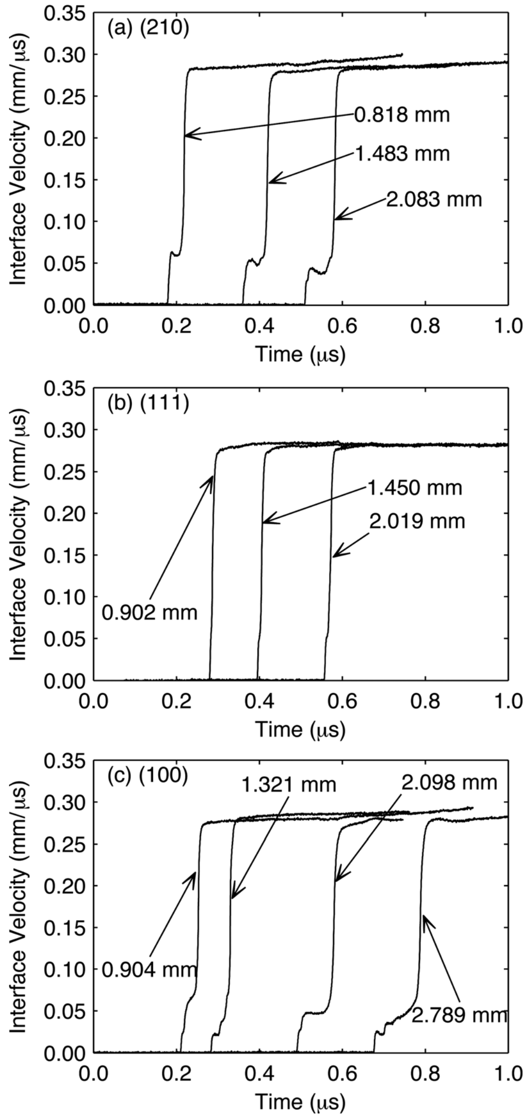

FIG. 2. VISAR particle velocity histories for impact experiments on (a) (210), (b) (111), and (c) (100) RDX planes. These are velocity records at the RDX/LiF (100) interface.

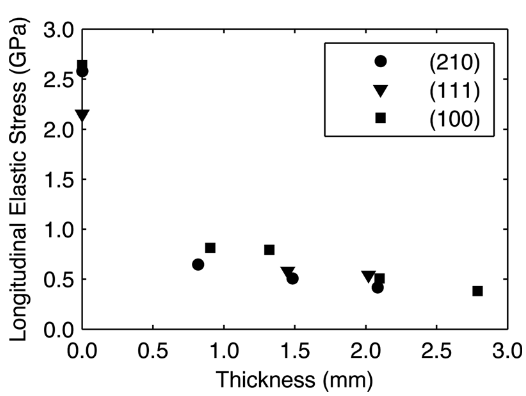

FIG. 3. Elastic precursor decay summary. Stress at zero thickness is calculated for an initial completely elastic response.

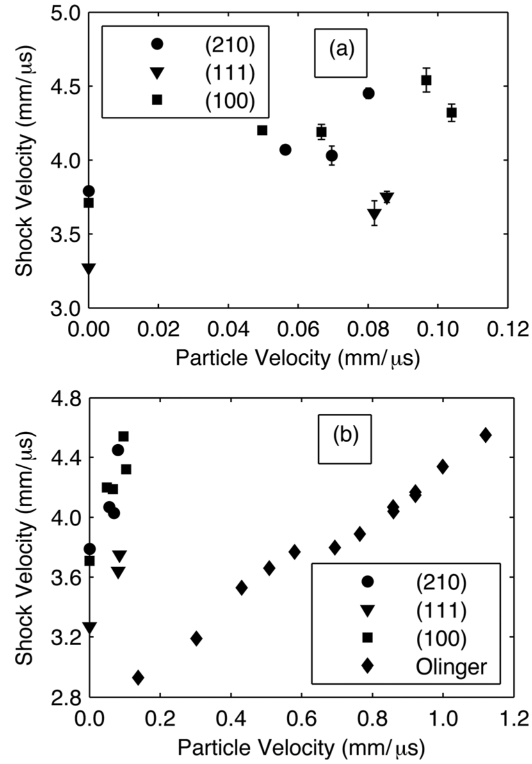

FIG. 4. Elastic Hugoniot data from the wave profile and pulse-echo measurements (a) and this same data presented with values deduced from the P-V isothermal data of Olinger *et al* (b). Error bars are the estimated simple error for each experiment. Linear fits to the elastic data (not shown) of $U = 3.75 + 6.43u$, $U = 3.27 + 5.12u$, and $U = 3.72 + 6.77u$ were obtained for (210), (111), and (100), respectively.

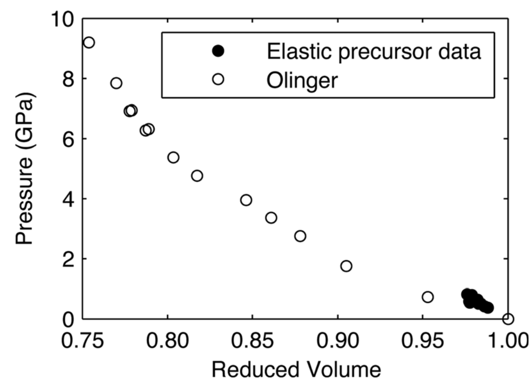

FIG. 5. Elastic Hugoniot data for all shots shown in the P-V plane with the isothermal data of Olinger *et al*.

[1]D. E. Hooks, K. J. Ramos, and A. R. Martinez, J. Appl. Phys. **100**, 024908 (2006).
[2]M. J. Cawkwell, K. J. Ramos, D. E. Hooks, and T. D. Sewell, J. Appl. Phys. **107**, 063512 (2010).