FIG. 8. Single-wire voltage for Alumel.

mechanical failures of the wires were not eliminated for that reason alone.

What is presumed to be chemical deterioration of the thermoelements was a significant problem at first. Effective flushing of the 1-atm temperature gradient with an inert gas was essential to obtain reasonable reproducibility with Chromel and Aluel at temperatures approaching 1000°C. On many of the runs these two wires had a darkened surface at the region of highest temperatures both in the 1-atm gradient and in the high-pressure gradient region where they were in BN. Runs whose maximum temperature was limited to 600°C did not show this effect. Since there was no apparent discrepancy in the data from the two cases, data were not eliminated from runs with slightly discolored Chromel and Alumel wires.

Two runs were made with AgCl as the pressure medium immediately adjacent to the test wires. In both cases the data for Chromel and Alumel were highly erratic, time dependent, and irreproducible. All the Chromel and Alumel data from these two runs were discarded. Pt and Pt10Rh were not adversely affected by the AgCl up to the maximum test temperature of 500°C.

Part of the Chromel and Alumel data from several other runs was eliminated owing to a progressive change in the single-wire voltages of one or both of the wires.

In general, all data were retained which included both thermoelements for either thermocouple and were self-consistent throughout an entire run.

The retained data for Pt–Pt10Rh included 7 runs, 21 excursions across the P–T plane and back, and 273 data points. There were 3 runs, 9 excursions, and 115 data points for Chromel–Alumel.

The voltages for each thermoelement were fit by

TABLE I. Standard deviation of surface fits to original single-wire voltage data.

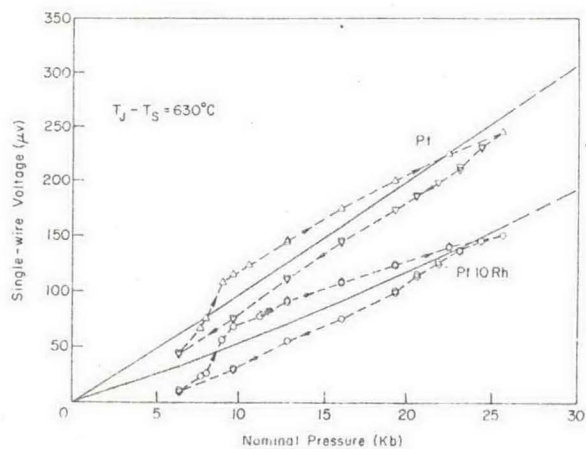|	
Pt10Rh	$\pm 8\ \mu$V
Pt	$\pm 14\ \mu$V
Pt minus Pt10Rh point by point	$\pm 10\ \mu$V
Chromel	$\pm 16\ \mu$V
Alumel	$\pm 8\ \mu$V
Alumel minus chromel point by point	$\pm 13\ \mu$V

FIG. 9. Isothermal data for Pt and Pt10Rh.