## Rapid Measurement of Mixture Fluid Properties with a Microfluidic Device

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We are focusing on a microfluidic approach to provide rapid measurements of mixture fluid properties. A typical example is using 1000 isolated microfluidic chambers to simultaneously map the fluid phase diagram of multicomponent mixtures, including measurement of the bubble point line, dew point line, critical point, and liquid volume lines within the two-phase region. The 1st generation device effectively measured the critical point of mixtures. A 2nd generation device, which includes a secondary "non-participating" liquid piston isolation scheme, has since enabled measurement of the phase envelope (including the critical point) of mixtures, for complete phase pressure-temperature analysis of mixtures. This isolation of micro-*PVT* cells widely expands the applicability of the invention to industrial processes. Measurements (e.g., 80.0 % propane + 20.0 % methane mixture) closely match modeled values, with a standard deviation of 0.13 MPa between measurement and model for the dew and bubble point lines, and a difference of 0.04 MPa and 0.25 °C between measurement and model for the critical point.