A Thermal Nucleation Method for the Rapid Measurement of Phase Diagrams

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We report on the use of a microsecond heat pulse by a fine wire to nucleate a vapor phase in a multicomponent liquid mixture. We have previously reported on the use of this thermally excited wire to overcome the nucleation barrier when detecting the boiling line. Morphologies resulting from this heat pulse depend upon factors such as the duration of the heat pulse, the total energy applied per pulse, the difference between the sample pressure and that of the equilibrium bubble point pressure, and the fluid composition. Measurements on synthetically prepared alkane mixtures as well as live reservoir crude oils will be presented.