

## **Deep Vacuum Fractionation and Characterization of Heavy Oil and Bitumen**

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A novel deep vacuum fractionation apparatus (DVA) for the characterization of heavy oil and bitumen samples is presented. The DVA is a batch distillation that can operate at pressures from  $10^{-1}$  to  $10^{-9}$  kPa and temperatures from 20 to 300 °C. Maltenes from a Western Canadian bitumen were fractionated in the DVA into boiling cuts up to 58 wt% of the bitumen, significantly surpassing the performance of spinning band vacuum distillation assays which distilled up to 30 wt% of the bitumen. The apparatus is also used to measure the vapour pressure versus temperature of the boiling cuts and residues. Methods to convert the measured vapour pressures to atmospheric equivalent boiling points are discussed. Physical properties of each cut are also measured and density and molecular weight data are presented as examples. The data from these heavy oil cuts provides the opportunity to improve property correlations and phase behavior modeling of heavy oils.