Solvent Loss in Tailings

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In the Tailings Solvent Recovery Unit, solvent added during froth cleaning is recovered by steam-aided flashing/stripping. However, not all the solvent is recoverable and a small fraction of the solvent remains in the tailings. In addition to being an economic loss in the extraction process, the solvent loss poses an environmental risk.

To better understand the nature of solvent loss and hence to design strategies for minimizing solvent loss, a systematic study was conducted to investigate solvent association in tailings. The association of paraffinic solvent (60% *n*-pentane, 40% *i*-pentane) with asphaltenes and clays (kaolinite and illite) was studied using TGA combined with FTIR. "Trapping" of up to 20 wt% solvent in asphaltenes was identified, while clays showed negligible association with solvent. The solvent trapped in asphaltenes (C5A) was removed thermally only by heating the sample to 100°C, whereas free solvent was released near ambient temperature. Figure 1 shows the weight loss as a function of temperature of dry asphaltenes, unassociated pentane with asphaltenes, and associated pentane with asphaltenes.

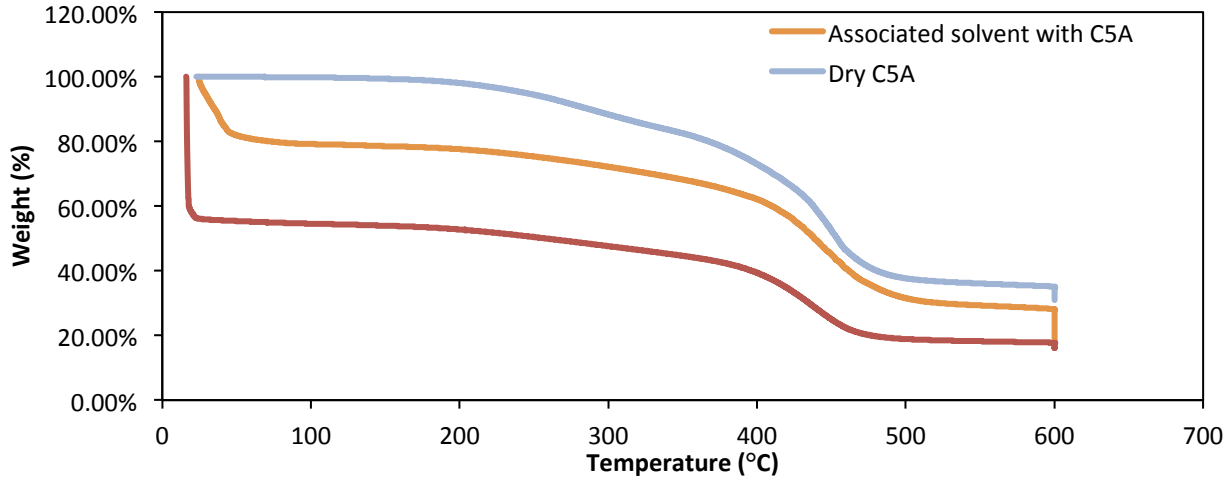

Figure 1. Weight loss as a function of temperature derived through thermogravimetric analysis