

the number of chlorides in their chemical structure (C_2HCl_3 and C_2Cl_4).

The corrosion behavior of CS was studied in those extracted waters to measure corrosion rate at different concentrations of each organic chloride compound separately in naphtha (Figure 4). It is obvious the corrosion rate increases tremendously with increasing the concentration of organic chloride compound in naphtha. If we assume that a crude oil contaminated with 10 ppm of TCE, then the concentration of TCE in naphtha will be 220 ppm, which can generate a high corrosion rate ~ 17 mm/y (670 mpy), which no system can tolerate. Corrosion in the NHT system is not routinely monitored during normal operation. However, some literature reviews^{3,8} and experience in refinery corrosion with overhead systems reveal the acceptable corrosion rate is ~ 0.075 mm/y (3 mpy). It indicates that the organic chloride compound in naphtha should not exceed 1 ppm in order to control corrosion in a NHT system; otherwise, the system will be exposed to very corrosive water.

Conclusions

This work investigates the partitioning effect of two volatile organic chloride compounds commonly used as solvent at upstream and downstream operation processes on the corrosion behavior of CS. The results indicate both chemicals concentrate almost totally in the naphtha cuts where the partitioning concentration is almost 19 to 22 times that injected in the crude, according to the number of chlorides in the different chemical structures. Acidity and chloride content in spent water increase severely with increasing organic chloride concentration in the naphtha. The corrosion mechanism was simulated by a HPHT autoclave using NHT operating conditions. The results confirm that the concentration of organic chloride in the naphtha should not exceed 1 ppm for corrosion control and maintaining the NHT integrity.

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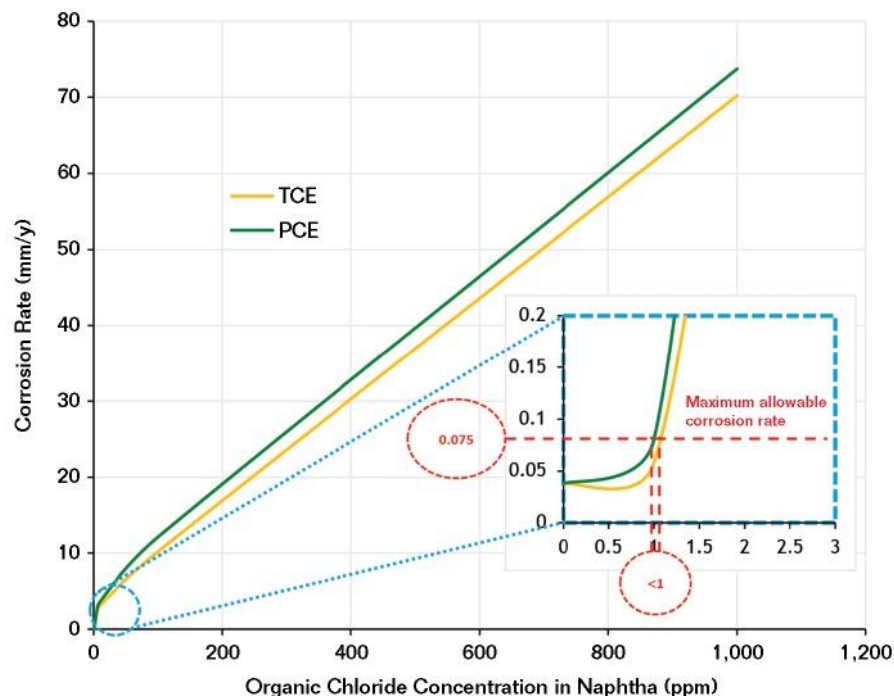


FIGURE 4 The relationship of organic chloride concentration in naphtha and corrosion behavior of CS.

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