

Carbon-supported Pt catalysts for the treatment and valorisation of brewery wastewater through aqueous phase reforming in alkaline medium

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3% Pt catalysts supported on different carbon materials (carbon blacks, activated carbons) were used to study the batch aqueous phase reforming (APR) of both synthetic (SBW) and real brewery wastewater (RBW) at 493 K, 24-28 bar in alkaline media (KOH and NaOH). In the APR of SBW, the TOC and COD removal was higher than 60 %. Catalysts supported on carbon blacks showed higher gas production, carbon conversion to gas and H₂ yields compared to those supported on activated carbons. The addition of alkalies to SBW did not lead to significant differences in the TOC and COD removal. Likewise, no significant differences in the TOC and COD removal were observed for NaOH and KOH. However the addition of NaOH and KOH to the SBW resulted in a higher percentage of H₂ in the gas fraction, with highest H₂ yields when KOH was added. Increasing the concentration of KOH in the APR of SBW suppressed the formation of CO₂, while the H₂ yield did not vary significantly. The results were validated in the APR of RBW, although the best performance was reached for catalysts supported on carbon blacks, indicating that the initial composition of the wastewater is a key factor the APR reaction.