

Production of Activated Carbon from Coal as an Alternative Material for Wastewater Treatment

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Abstract. The study investigated the production of activated carbon from coal as an alternative adsorbent for wastewater treatment. Using a two-stage process—high-temperature carbonization followed by chemical activation with 2 M KOH—to prepare a porous carbon material and evaluated its physicochemical properties against the Indonesian National Standard SNI 06-3730-1995. The activated carbon met the moisture ($\leq 15\%$) and ash ($\leq 10\%$) limits, with measured values of 12.84 % and 8.95 % respectively, but fell short on volatile matter ($30.96\% > 25\%$), fixed carbon ($47.25\% < 65\%$), and iodine adsorption capacity ($353.40\text{ mg g}^{-1} < 750\text{ mg g}^{-1}$). The methodology, including carbonization without oxygen and subsequent KOH activation, is described in detail, and the overall aim to assess coal-derived activated carbon for reducing turbidity, odor, color, and dissolved pollutants in wastewater is outlined. Overall, the study indicates that further refinement of activation parameters is required to ensure standard compliance and maximize adsorption performance.

Keywords: Coal, Activated Carbon, Chemical activation, Wastewater, Adsorption