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Abstract	:	<p>The photocatalytic of POMSE able to further degrade organic compounds by utilizing suitable semiconductor catalyst, to be excited by UV rays, to form hydroxyl radicals (OH). This paper reports on the photocatalysis of palm oil mill secondary effluent (POMSE) over 15wt%Ni/CaO and 20wt%Ni/CaO catalysts. Calcium Oxide (CaO) was extracted from chicken eggshell, thus promoting waste recycle. The reaction was carried out in a 30 ml reactor, with UV lamp (120 watt) as the light source, employing constant temperature of 298 K and reaction time of 2, 3 and 5 hours. TPC analyses demonstrated the calcination profiles of uncalcined catalyst and revealed reaction temperature of 1073 K was ideal for the catalyst calcination. In addition, Kissinger-Akahira-Sunose (KAS) kinetic model was used to identify the activation energy of 15wt%Ni/CaO (65.96 kJ mol⁻¹) and 20wt%Ni/CaO (86.86 kJ mol⁻¹). With the lower activation energy value, 15wt%Ni/CaO predicted to achieve higher POMSE photocatalysis conversion. The FTIR analyses identified the existing functional groups of the catalyst. Meanwhile, the COD of raw POMSE was 4600 mg/L. From the COD value of raw POMSE, the photocatalysis of POMSE demonstrated decreasing trend for both catalysts. Accordingly, the 15wt%Ni/CaO and 20wt%Ni/CaO catalyst achieved highest POMSE conversion of 2550 mg/L and 1870 mg/L at highest reaction time of 5 hours. Similar pattern was observed in the UV/VIS analyses of melanoidin degradation where 8.85% and 10.71% for 15wt%Ni/CaO and 20wt%Ni/CaO, respectively...see more.</p>