# ABSTRACT

The dependence on fossil fuels has led to a major environmental crisis due to the production of greenhouse gases and global warming. Hydrogen is a sustainable, clean fuel that produces zero carbon emissions. In this study, a high-performance electrocatalyst, cerium-doped barium tungstate/graphitic carbon nitride (Ce-$BaWO_4$/GCN), was synthesized and evaluated for its electrocatalytic efficiency in water splitting. Cerium-doped barium tungstate (Ce-$BaWO_4$) was easily synthesized by the co-precipitation method, and graphitic carbon nitride (GCN) was synthesized and exfoliated by calcination. Ce- $BaWO_4$/GCN heterojunction was prepared by ultrasonically assisted dispersion in water. FTIR peaks at 1448, 986, 602 $cm^{-1}$ confirmed the formation of Ce- $BaWO_4$/GCN. The overpotentials for oxygen evolution reaction (OER) and hydrogen evolution reaction (HER) were 241 mV and 68 mV at 10 mA. Moreover, the tafel slopes of 68 mV/dec and 59 mV/dec were observed for Ce- $BaWO_4$/GCN, which showed faster kinetics of reactions. All these parameters confirmed superior electrocatalytic performance for overall water splitting by Ce- $BaWO_4$/GCN. The addition of Ce-$BaWO_4$ to g-$C_3N_4$ created a heterojunction that assisted the separation of the electron-hole pairs more effectively.