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**Flowing nitrogen atmosphere induced rich oxygen vacancies
overspread the surface of TiO₂/kaolinite composite for enhanced
photocatalytic activity within broad radiation spectrum**

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Graphical Abstract

Novel 0D/2D TiO₂/kaolinite composite endowed with oxygen vacancy state was facilely fabricated via a mild sol-gel method associated with nitrogen atmosphere induction. Enhanced adsorption-photocatalytic degradation ability for the removal of ciprofloxacin (CIP) and formaldehyde within broad spectrum radiation were achieved. The enhancement was attributed to the generation of oxygen vacancies as well as the natural minerals carrier effect (enhanced adsorption ability, good dispersion performance, smaller grain size, improved electron-hole separation efficiency due to synergistic effect, etc). This study provides new insight into mineral

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