Title: Experimental and modeling study of visible light responsive photocatalytic oxidation (PCO) materials for toluene degradation

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Highlights

1. Morphology, structure and band-gap energy of TiNbON demonstrate its ability to be driven by visible light.
2. Toluene removal by TiNbON strongly depends on humidity, concentration and irradiance.
3. A Langmuir–Hinshelwood kinetic model considering one active site with competition best fitted results.
4. TiNbON advantages for VOC removal include low sensitive to RH, less formaldehyde formation, and durability.