

Polychlorinated biphenyls (PCBs) are toxic pollutants notorious for their aquatic and sedimentary prevalence and recalcitrant nature. Bimetallic systems like Pd/Fe have been widely studied for degrading them. Mg, with oxidation potential higher than Fe, has been reported to dechlorinate PCBs in conjunction with K_2PdCl_6 - systems that are distinct from Pd/Mg bimetallics. This study primarily aims to evaluate Pd/Mg bimetallic systems for dechlorinating 2-chlorobiphenyl (2-ClBP), a model PCB. Candidacy of Mg is based on its unique corrosion properties that afford synthesis and storage under ambient conditions and application-based advantages. A simple wet-chemistry procedure was developed to synthesize Pd/Mg particles with 0.11 % to 1.62% Pd content and nano-scale Pd-islands as determined by X-ray diffraction (XRD) and environmental scanning electron microscopy (ESEM). Aqueous 2-ClBP matrices were effectively degraded using these particles, the dechlorination kinetics showing linear dependence on the total Pd content. The pH profile obtained with varying bimetallic content led to useful insights into the unique behavior of Mg surface. A carbon mole balance showed 85-105% recoveries. Performance of the Pd/Mg particles in PCB spiked clays and sediment suggests that they may work well in such systems. Finally, a mechanism for PCB dechlorination in Pd/Mg systems was proposed.