

Table S1. The search strategy of keywords is based on the Web of Science.

Search strategy
<p>[(iron-based materials) OR (zero-valent iron) OR (n-ZVI) OR (ferrous sulfide) OR (magnetite) OR (Iron-carbon composite) OR (iron-based catalyst) OR (Fe-based catalysts) OR (carbon-based catalysts) OR (iron oxides )] and [(repair) OR (remov* ) OR ( degrad* ) OR (Cataly* ) OR ( oxid * ) OR (oxida* ) OR (reduc* ) OR (Mineralization) OR (activat* ) OR (remediation)] and [(modif* ) OR (pyroly* ) OR (vulcanize* ) OR (sulfide-modified n-ZVI) OR(S-nZVI) OR (load* ) OR (curing) OR ( sulfide*)] and [(Organic Pollutants) OR (organic contaminants) OR (POP) OR (persistent organic pollutant) OR (chlorinated hydrocarbons) OR (halogenated hydrocarbons ) OR (TCE) OR (PCBs) OR (chlorinated organics) OR (Chlorinated Organic Compounds) OR (trichloroethene) OR (petroleum hydrocarbons)] and [(environment* ) OR (Water) OR (groundwater) OR ( wastewater) OR ( soil )]</p>

Figure S1. Classification of published papers based on searches of the Web of Science databases. (a) The classification (percentage) of published papers based on organic pollutants, (b) The classification (percentage) of published papers based on advanced oxidation types, (c) The classification (percentage) of published papers based on iron-based materials. The relevant data of pollutant types, oxidation types, iron-based types, and modification types in each literature were extracted. The related data were shown in the Excel table in the **Supplementary Excel File 1**.

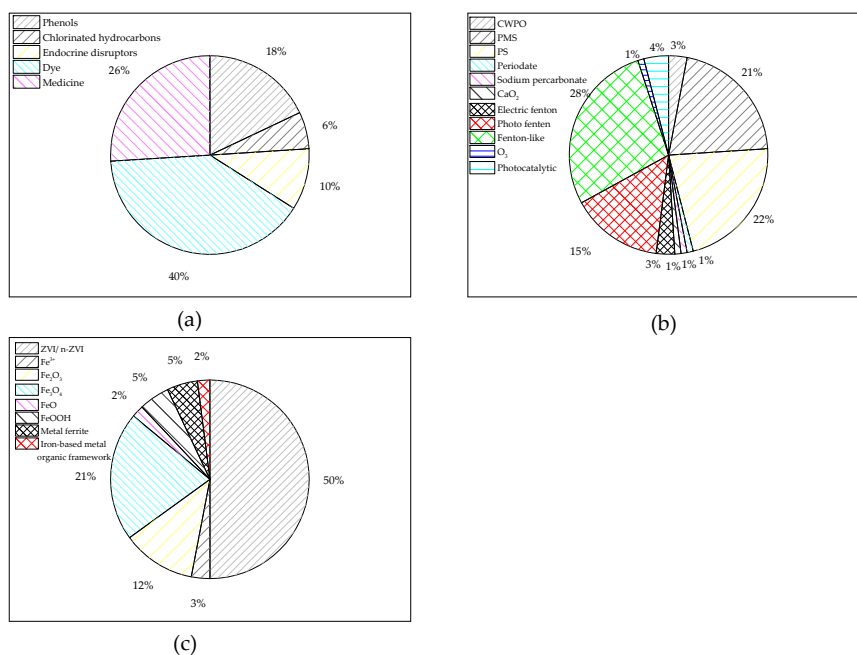


Table S2. The functional modification type of iron-based materials is based on the literature classification. All classifications are based on data extracted from relevant literature on the iron-based material modification for removal of organic pollutants searched in the Web of Science using keywords. The related data were shown in the Excel table in the **Supplementary Excel File 1**.

Supporting materials			Stabilizer materials		Doping second metal (bimetallic system)
Carbon-based materials	Biochar	Doping with non-metallic elements: Boron (B), Nitrogen (N), Sulfur (S)	Chelating agents	Ascorbic acid	Co
	Activated carbon			Tannic Acid	
	Graphene			Citrate	
	Carbon nanotubes			Nitrilotriacetic acid	Ni
	Salicylic acid				
	Glutathione				
SiO <sub>2</sub>				Epigallocatechin gallate	Ag
Clay minerals	Natural sepiolite		Polymer	β-alaninediacetic acid	Cu
	Montmorillonite			Carboxymethyl cellulose	
	Calcite			Chitosan	Al
	Zeolite			β-cyclodextrin	
Metal oxide	MgO			Surfactant	Taxane diterpenoids
	Al <sub>2</sub> O <sub>3</sub>		Sulfide		
	MnO <sub>2</sub>				
Metal-organic framework					