

Chemistry Education 2018: Practical reduction of manganese oxide- Fikri Erdem Şeşen Fikri Erdem Şeşen

Manganese is an important metal used in the steel industry. It is an alloying element in abundant steel. In addition, it is used as a deoxidizer in the production of steel. In the steel industry, manganese metal is used as an intermediate product of ferromanganese. Ferromanganese is the most commonly produced reduction of oxidized manganese. The reduction takes the form of a metalothermal reduction or a carbothermic reduction. In practice, metallographic reduction is carried out with silicon or aluminum which forms more stable oxides than magnesium. Carbothermic reduction means reduction with carbon. All reduction reactions are highly endothermic and a large amount of thermal energy is required to carry out these reactions. The most abundant forms of manganese oxides are MnO₂, Mn₂O₃, Mn₃O₄ and MnO. These compounds dissociate upon heating.

Manganese (IV) oxide is an inorganic compound with the formula MnO. This blackish or brown solid occurs naturally in the form of mineral pyrolusite, which is the main manganese ore and a component of manganese nodules. MnO is mainly used for dry cells, such as the alkaline cell and the zinc-carbon cell. MnO is also used as a pigment and as a precursor of other manganese compounds, such as KMnO₄. It is used as a reagent in organic synthesis, for example in the oxidation of allylic alcohols. The MnO in the □ polymorph can incorporate a variety of atoms (as well as water molecules) in the "tunnels" or "channels" between the manganese oxide octahedra.

A useful use of manganese dioxide is as an oxidant in organic synthesis. The efficiency of the reagent depends on the method of preparation, a problem which is typical for other heterogeneous reagents where the surface area, among other variables, is a significant factor. The mineral pyrolusite makes a bad reagent. Usually, however, the reagent is generated in situ by the treatment of an aqueous KMnO₄ solution with an Mn (II) salt, usually sulfate. Oxides allyl alcohols to aldehydes or ketones et leur évolution réactionnelle peut être suivie dans des études cinétiques. La réaction de LBB avec des solides de Mn oxydés peut se produire via une réaction de transfert d'atomes d'hydrogène (HAT), qui est un processus de transfert à un électron, mais est défavorable avec des solides de Fe oxydés. La thermodynamique HAT est également favorable au nitrite avec LBB et MnO₂ avec

Ammonia (NH₃). Reactions are unfavorable for NH₄⁺ and sulfide with oxidized Fe and Mn solids, and NH₃ with oxidized Fe solids. In laboratory studies and aquatic environments, the reduction of manganese oxides leads to the formation of Mn (III) ligand complexes [Mn (III) L] at concentrations that are important even when two-electron reducers react. The main asking agents are hydrogen sulfide, Fe (II) and organic ligands, including the siderophore desferrioxamine-B. We present these reducers with MnO₂ (□max ~ 370 nm) of colloidal solutions on the present laboratory data. In the marine waters, no colloidal form of oxides of Mn (<0.2 μm) has been detected because the Mn of the oxides are quantitatively trapped on filters of 0.2 μm. Thus, The reactivity of the Mn oxides with those of the solvent agents depends on the surface reactions and possible surface defects. In

the case of MnO₂, Mn (IV) is an octahedral coordination in an inert cation; Thus, an internal sphere process is likely to enter the empty conduction band e * g of its orbitals. Using the theory of boundary molecular orbits and band theory, we discuss aspects of these surface reactions and possible surface defects that favor hydrogen sulfide and other reducers. In the case of MnO₂, Mn (IV) is an octahedral coordination in an inert cation; Thus, an internal sphere process is likely to enter the empty conduction band e * g of its orbitals. Using the Theory of Boundary Molecular Orbits and Band Theory, Hydrogen sulfide and other reducers that may favor these surface reactions and possible surface defects. In the case of MnO₂, Mn (IV) is an octahedral coordination in an inert cation; Thus, an internal sphere process is likely to enter the empty conduction band e * g of its orbitals. Using the theory of boundary molecular orbits and band theory, we discuss aspects of these surface reactions and possible surface defects that favor hydrogen sulfide and other reducers.

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The reduction of manganese oxides is two stages in envisaged. The first step is the reduction of oxygen-rich oxides to MnO and the second is the reduction of Mn to metallic manganese. The reduction with the transformation of MnO₂ into Mn₂O₃ and Mn₂O₃ into Mn₃O₄ at temperatures above 450 ° C, then these two phases are reduced either by carbon or by carbon monoxide in the Mn-CO system.

The ratio P_{CO} / P_{CO₂} at 1430 ° C is 7400. Since the reduction of MnO with MnO is only 7400. The reduction, if any, of the monoxide carbon can only be obtained. carbon, at temperatures above 1430 ° C and at an extremely high carbon monoxide pressure, the reduction of MnO with p monoxyut in many industrial applications. For this reason, reduction of MnO with solid carbon or iron carbide occurs. In addition, manganese carbides are also formed during the carbothermic reduction of manganese oxides. The temperature required for the formation of manganese carbide (1280 ° C) is lower than that of the metallic manganese (1430 ° C). Therefore, the metallic manganese of the formation is inevitable.