

Jeanie Hess

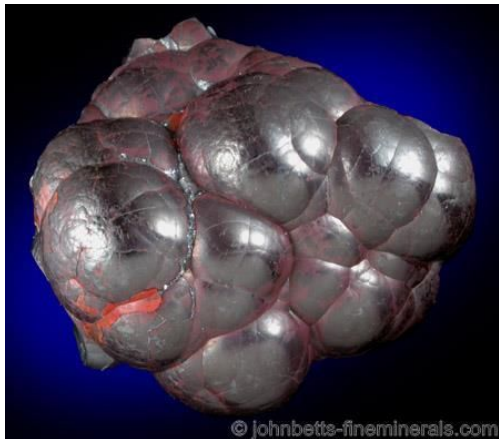
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Ore/Steel Making Project

There are several ores that are mined to make many different materials. Steel is important to society and requires iron. Because these material is used in many applications across the world the ores used to make steel and iron are significant. This paper will cover just a couple of options for ores that can be used and the methods of making these materials. There are several ways that steel can be made but commonly the processes include these ores and chemical reactions in high temperature.

Iron ores cover a good portion of the earths crust. There are many types of iron ores but they have similar enough properties to make them under the canopy of being an iron ore. One



*Hematite*

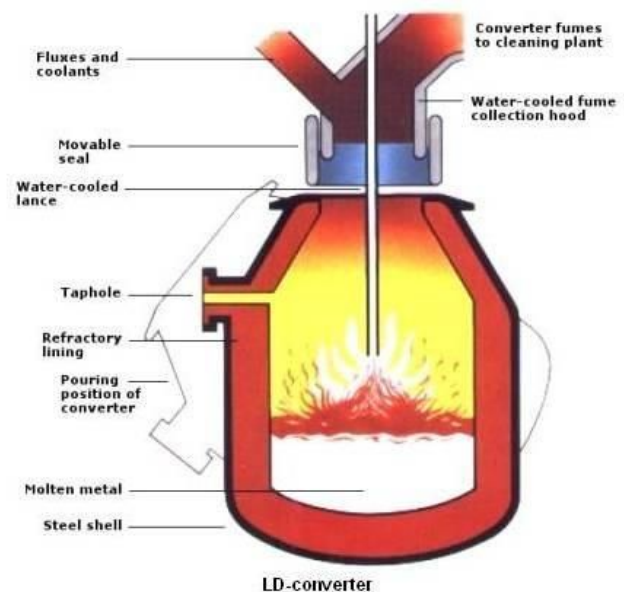
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of the ore that have the highest level of iron content is magnetite. This ore also is known for its magnetism, hence the name, which ends with other small particles of iron attached to magnetite during mining. Although the magnetite is very high in iron, hematite is much more abundantly found, which makes it a better

candidate to use in steel making. Another good reason that hematite would be better to use for steel is that it is slightly harder than magnetite. One would be able find these two minerals together from time to time because the hematite is attracted by the magnetism.

During the process of steel making minerals such as these can be used. Starting with the ensuring that the raw materials that have been mined are clean of impurities and formed into pellets. Then these pellets can be combined with coal to create pig iron, which is molten metal that is used for steel making. This pig iron must be refined, removing yet another set of impurities and adding various elements to control the type of steel that is to be obtained. While the metal is still molten there are three common furnaces that are used for the upcoming processing. There used to be four types of furnaces but the open-hearth furnace is being replaced with updated designs. One is the electric furnace, which uses an electric arc that charges the metal reaching temperature around 3500 degrees Fahrenheit. After two hours in this furnace the metal is placed in a ladle to

move to the next process. This furnace can produce up to 90 tons of steel daily. The basic-oxygen furnace or BOF is the most commonly used for steelmaking and use the most pig iron. When using this furnace, the molten mixture gets placed inside and air tight container. Then oxygen gets injected into the container to create the chemical



reactions needed. This method can get to about 180 psi. During this a fluxing mineral is combined to the mixture and the metal is continuously agitated. At the end of maximum 50 minutes, the process can refine about 250 ton of metal. The final furnace that is used is the vacuum furnace, which is considered an induction furnace. Within this procedure they remove

all the air and begin to cool the metal with gas, such as argon, at a high pressure. This can be used to heat treat metal but can also create high quality steel. These furnaces start with molten metal and end with a type of steel that can be continued through further processing depending on what the steel is to be used for.

Starting with what seems to be large amounts of tiny pieces of earth, such as hematite or magnetite, sorted out of impurities and heated up to extreme temperature. All combined with various elements and gases, such calcium, oxygen and argon, to create a metal that you can see almost anywhere you go in the world, used for one application or another. This final material that is all well-known is steel.

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