



Breakthrough technologies for steelmaking industry for a better future

Steel is the most important material for any economy and many economists use per capita steel consumption as the barometer of the health of the economy of any country.

Over years, the process of steelmaking has not evolved much over and above the age old method of reducing the Iron Ore with Coal or Coke in either a Blast Furnace or an Electric Arc Furnace, etc.

The minimum Carbon Dioxide emission is approx 1.80 tonnes per tonne of steel produced and is a major contributor to the green house gases and global warming which has brought about global warming and it's consequent effects.

Let us now examine, whether with a better understanding of materials and their structure, we can now imagine improved methods of steelmaking with a lower carbon footprint?

It is a known correlation that:-

Co2 Emissions lead to Climate Change leading to Natural disasters

The best European steel plants are operating at the limits of what is presently technically possible.

So we must now examine breakthrough technologies for steelmaking industry for a better future.

A) Using Dual Nature of Matter

We all know that although matter appears as solid at



atomic levels it exhibits its nature as waves.

This is the logic used in microwave cooking of food, which uses microwaves to resonate with the moisture (water) content in organic foods resulting in resonance so violent that heat is generated internally to the food being cooked thereby cooking the food inside out, and very quickly in a matter of minutes whereas by normal cooking it would take much much longer.

Using this method, we can resonate at the frequency of the Oxygen atom within the Iron Oxide and vibrate the atom so violently that the Oxygen atoms break the molecular bond and exit from the molecule leaving behind only the Iron atoms.

This violent agitation of the Oxygen atoms will also release a lot of heat due to the mechanical vibration as also the breaking of the molecular bond will release it's own energy being an exothermic event, so the Iron left behind melts and assumes liquid form.

Once liquefied it can be



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handled to either be poured or be further processed.

The only emission of this process is Oxygen which is very pure grade.

B) Using Alkaline Electrolysis

CONCEPT is the transformation of iron ore into metallic Fe and O₂ using only electrical energy and low temperature.

No need of coke ovens, melting or reducing vessels (BF, converters, shaft furnace).

This is the CO₂ leanest process of steelmaking.

No iron is presently produced industrially by electrolysis and it is under intense research.

We are all familiar of the process of Electrolysis of other metals (Al, Ni, Zn) already in industrial scale all over the world but somehow Steel making was overlooked and is now being actively evaluated.

The energy source for the electrolytic cell could be the Solar / Wind energies which are normally unshedulable power and are difficult to use in industry unless expensive Banking arrangements are made, so can be profitably used here.

The preferred electrolyte would be Sodium Hydroxide Solution and in laboratory we found that a temperature of 110 degrees Celsius was most ideal.

The oxygen captured at Anode was pure enough to be used for medical purposes.

The only emission of this process being Oxygen.