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&

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### Water and wax for low energy and non-polluted iron and steel industry

Oil rich countries now using natural gas as a source for reducing gas production ( $H_2=75\%$  and  $CO=14\%$ ) for the production of direct reduced iron (DRI) from iron oxide ore. In this research a new source created which is pure hydrogen > 99% obtained from electrolysis of water. The size of hydrogen atom is much smaller than that of carbon monoxide molecule, thus hydrogen could penetrate much deeper into the crystal structure of the iron oxide resulting in greater degree of metallization for the same time of reduction. After reduction, hydrogen returns back to water, thus no material consumed with hydrogen (closed circuit process). Since huge quantity of hydrogen is needed to reduce the iron oxide (e.g. to produce one million tons/year DRI), so prolonged electrolysis of alkaline aqueous solution is required; this will be accompanied by large quantity of oxygen gas liberated at the anode electrode (430000 tons/year) which is useful for industry and health purposes,

as well as production of about 108 tons/year heavy water residue uses in nuclear Industry. The world production of DRI is 75 million tons/year and continuously increases. In the present DRI is comparatively new cargo that has already presented problems when shipped in bulk with its sponge - like structure is chemically reactive and easily oxidized with liberation of heat and hydrogen. The author has developed an efficient process for the treatment of DRI known as Waxing Process makes the DRI resistant to both oxidation, corrosion, ignition and stop iron dust formation.

#### Speaker Biography

Jaleel K Ahmed has expertise in evaluation in Iron and steel industry. He registered 3 patents in USA, UK and Iraq about using water in iron industry an wax for storage and transportation DRI, and using wax for carburizing of steel. Also he used chlorophyll as gamma ray absorber to protect Iraqi children from cancer. He also used the mechanically red beet juice as scavenger for poisonous heavy metal ions and anticancer and detoxification of urea and uric acid from human body via urine system.

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