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Comparative Life Cycle Analysis (LCA) Study on Two Wear-Resistant Boron Steels

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ABSTRACT

We live in the era of "Industry 4.0", or the Fourth Industrial Revolution, always taking into account when the first Industrial Revolution (1760-1840) took place. Within this industrial revolution the reduction of environmental impacts has become a universal priority. Industrial growth must be proportional to the growth of clean technologies. The study of Life Cycle Assessment (LCA) is key in all phases of the ecological and economic sustainability of an industrial product or service.
The inter-critical heat treatment proposed by us is a practical example of economic and environmental sustainability applied to wear-resistant boron steels. In this research we tried to compare the LCAs of two wear-resistant steels, a RAEX450 and a 30MnB5 boron steel, which was subjected to an inter-critical treatment. This inter-critical treatment improves the LCA by lowering the treatment temperatures, saving the heat energy used and reducing the procedure time, obtaining the same mechanical characteristics and even better in some aspects such as wear resistance and toughness. We are going to see all this in front of a typical example in the industry as they are the steels RAEX450, resistant to the wear, with a typical heat treatment of heating to 900ºC during 30 minutes, hardening in water and later tempering to 600ºC during 120 minutes.
Importance of Chromatography: The importance of Chromatography is increasing rapidly in pharmaceutical analysis. The precise differentiation, selective identification and quantitative determination of structurally closely related compounds.High.

Multiple reports have been provided of conjugated polymers with spirocyclic ring systems. The use of a tetrahedral core in combination with a planer conjugated backbone was used to monitor thin film microstructure and increase system efficiencies in many cases. In particular,spirocyclic fluorine and sila-fluorine based conjugated polymers have demonstrated increased stability and decreased emission relative to their comparable non-spirocycle. Spricocycles are widely used as electron- acceptors in organic solar cells. Similarly, spirocyclic small molecules are the most common type of hole transport materials in hybrid solar cells. Interestingly, small molecule spirocyclic hole conveying materials were also used to produce high-efficiency solar cells even at low concentrations. Nevertheless, so far, the use of spirocycles in conjugated polymers has been primarily to regulate their solid state structure, and their ability in terms of the polymer backbone's electronic manipulation has largely been overlooked. In contrast, spiro conjugation has been used several times in small molecules to monitor the molecular frontier orbitals and their respective interactions. Here we present a series of spirocyclic conjugated polymers, where you can use the orthogonal ring method to control the polymer's electronic structure. Therefore we envisage a method by which both electronic and morphological properties can be simultaneously enhanced.

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