BOS100 IS NOT A MIXTURE OF IRON AND ACTIVATED CARBON



BOS100 has zero-valent iron (AC/nZVI) within and throughout the carbon structure to optimize the technology for simultaneous adsorption and reduction of halogenated compounds.

UNIQUE MANUFACTURING APPROACH FOR BOS100

Granular activated carbon is treated with an iron salt solution, allowing the solution to fill the inner pore structure of the carbon. The solution-impregnated carbon is then heated to approximately 850 C in a rotary furnace under reducing conditions so that metallic iron forms as the salt decomposes. As the metallic iron is formed, it partially dissolves into the carbon, creating a new and unique material with properties of both carbon and iron. See Figure 1.



Figure 1. Image of BOS100. The blue arrow points toward iron in the carbon structure. The image demonstrates the integral relationship between iron and carbon. XRD image, Colorado School of Mines.

BOS100 IS ANALOGOUS TO CAST IRON

As manufactured, the product contains roughly 6.5% (wt) metallic iron to carbon. This is kind of like the inverse of cast iron which is greater than 2% carbon. When you examine cast iron, you easily see that it is a distinct substance from iron. Similarly, when you see the iron in the activated carbon, as in Figure 1., you recognize the BOS100 is a distinct substance.

IRON MIXED WITH ACTIVATED CARBON RESULTS IN AN ANTAGONISTIC EFFORT

When powdered iron and activated carbon are mixed, a halogenated molecule can either be adsorbed to the activated carbon or be reduced by the iron. The halogenated compound adsorbed by the activated carbon is protected from contact with the nZVI! This is an antagonistic relationship. For this reason, the original patent for a mixture of activated carbon and iron was never commercialized (5,534,154, July 9, 1996). The research on which the patent was based clearly stated that activated carbon's failure to desorb adsorbed halogens eliminates it as an effective additive with nZVI (Huo, 2001).