**Top Ten List of Characteristics**

**for FerrockTM—a New Green Building Material**

1. Compressive strength tests show the pure paste (without aggregate) to be stronger than comparable samples of Portland cement. Typical strength is in the range of 5,000 to 7,500 psi but can be as high as 10,000 psi, depending on variations in the mix and curing process.

2. Flexural strength tests show the pure paste to be four times stronger than comparable samples of Portland cement. Small cast beams of FerrockTM averaged nearly 1,200 psi compared to 300 psi for similar samples of Portland cement. Addition of glass fibers increased the difference.

3. Analysis (atomic absorption spectroscopy) shows that fully cured samples contain between 8 and 11% captured CO2 by weight. FerrockTM is therefore "carbon negative" unlike Portland cement, which during manufacture is a major source of CO2 and other air pollutants.

4. X-ray diffraction shows that the predominant mineral that forms and causes cementation is siderite, which is iron carbonate. The iron comes from the particles of steel dust in the mix and the carbonate comes from the CO2 that diffuses into the paste.

5. When exposed to high heat FerrockTM does not break down as does Portland cement. Instead, at 1,100°C it becomes much harder as the mineral structure converts to magnetite and iron silicate. However, the carbonate is lost and the trapped CO2 is released.

6. Initial tests show that FerrockTM does not break down upon exposure to salt water as does Portland cement. In fact, some of the salt and especially chloride ions can be incorporated into the mineral structure. Its ability to protect embedded steel reinforcement is being studied.

7. FerrockTM can also trap some toxic contaminants such as arsenic in its mineral structure. Iron minerals are known to be effective absorbents for certain pollutants.

8. FerrockTM has been shown to effectively bind crushed glass aggregate and can recycle this waste mineral into useful building products and structures. There is no "alkali silica reaction" as there is with Portland cement.

9. The main ingredient in the initial mix is iron and this can be in the form of waste steel dust, which is currently not being recycled in any way and is available for no cost from generators.

10. Hydrogen gas is a by-product of the curing reaction and this clean fuel might be harvested from a large scale operation for heating or as a feed stock for other chemical reactions.