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Rust shines in new light

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Electrical cars, wind machines, computer hard drives and most electrical motors require permanent magnets to operate. These are typically made of neodymium–iron–boron alloys, because of their large magnetocrystalline anisotropy and saturation magnetization. However, the magnets use considerable amounts of increasingly expensive rare-earth compounds such as neodymium and dysprosium, thus alternatives are strongly sought after, but with little success so far. Shin-ichi Ohkoshi and colleagues now demonstrate that a relative of common rust could solve this problem. Doped with a few per cent of rhodium, the ferrite $Rh_xFe_{2-x}O_3$ is shown to have a very large coercive field of up to 31 kOe, and shows good microwave absorption as well as magnetic rotation properties that are of interest, for example, in wireless communication applications. Furthermore, the high coercive field could be useful for information storage applications, where it may allow the reduction of the area necessary for a stored bit. Although rhodium may not be a low-cost material either, the relatively small quantities required still promise a new future for magnetic ferrites.