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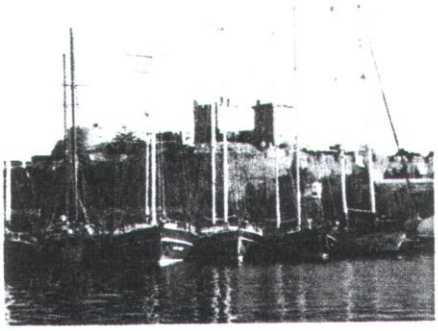


ÖZET KİTABI

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SYNTHESIS OF SUPERPARAMAGNETIC MAGNETITE NANOPARTICLES AND THEIR CHARACTERIZATIONS

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Magnetic nanoparticles have been attracted a great attention in recent years. Due to the special properties of magnetic nanoparticles, they have many applications in different areas such as in magnetic recording media and ferrofluids. They can also be used in biomedical areas like gene seperation, targeted drug delivery, contrast agent in magnetic resonance imaging depending on their specific magnetic behavior. Co-precipitation is one of the most common techniques used to obtain magnetic nanoparticles. In this study, magnetite nanoparticles were synthesized by co-precipitation in air atmosphere, and their structural and magnetic properties were investigated as a function of synthesis parameters. The structural analysis made by X-ray diffraction (XRD) and fourier transform infrared spectroscopy showed that the product of the synthesis is magnetite. Magnetite nanoparticles displayed zero coercivity indicating the superparamagnetic behavior with the high saturation magnetization values. Tranmission electron microscopy measurements exhibited that the size of magnetite nanoparticles is changing between 10-20 nm. The particle sizes were also consistent with the ones calculated from magnetic data according to the Langevin function and obtained from XRD patterns. It is found that the sizes and magnetic properties were highly affected by the parameters of co-precipitation.