

## MAGNETIC LANGMUIR-BLODGETT FILMS OF FERRITIN WITH DIFFERENT IRON CONTENTS

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Magnetic Langmuir-Blodgett films of four ferritin derivatives with different iron contents containing respectively 4220, 3062, 2200 and 1200 iron atoms have been prepared by using the adsorption properties of a 6/1 mixed monolayer of methyl stearate (SME) and dioctadecyldimethylammonium bromide (DODA). The molecular organization of the mixed SME/DODA monolayer is strongly affected by the presence of the water-soluble protein in the subphase as it has been shown by  $\pi$ -A isotherms, BAM images and imaging ellipsometry at the water-air interface. BAM images reveal the heterogeneity of this mixed monolayer at the air-water interface. We propose that the ferritin is located under the mixed matrix in those regions where the reflectivity is higher while the dark regions correspond to the matrix. Ellipsometric angle measurements performed in the zones of different brightness of the mixed monolayer confirm such heterogeneous distribution of the protein under the lipid matrix. Transfer of the monolayer onto different substrates allowed the preparation of multilayer LB films of ferritin. Infrared and UV-vis spectroscopy indicates that ferritin molecules are incorporated within the LB films. AFM measurements show that the heterogeneous distribution of the ferritin at the water-air interface is maintained when it is transferred onto solid substrates. Magnetic measurements show that the superparamagnetic properties of these molecules are preserved. Thus, marked hysteresis loops of magnetisation are obtained below 20 K with coercive fields that depends on the number of iron atoms of the ferritin derivative.