The continuing increase in areal density, and therefore in coercivity, of today's storage media has made it essential that higher moment soft magnetic materials be invented, in order to enable fast writing in the new media. The highest moment values ever obtained experimentally have been in the cobalt-iron system, where bulk values slightly exceed 2.4 T in the composition range of 55-78% Fe (1). However repeated attempts to reproduce such high moments in thin films (2, 3) have not been successful until now. Unlike low-iron CoFe films (e.g. Co_{0.7}Fe_{0.3} (4)), plated high-iron CoFe films have substantially lower moment than the equivalent bulk materials, largely because of oxygen incorporation (2). In addition, the high-Fe films are typically dark, stressed, and have poorly developed magnetic anisotropy.

We will present here a method for obtaining the magnetic films with high moment values (2.4 T) in plated CoFe films and will describe their properties. The latter include high brightness and stress, which is low enough to enable plating to a thickness of about 1.7 microns, magnetic anisotropy, and acceptably low coercivity.

Plating was performed in a horizontal paddle cell, in a ~800 Oe magnetic field, out of solutions and under conditions similar to those described in (2, 4, 5) for plating CoFe and CoFeCu alloys. The plating solution contained cobalt sulfate, ferrous sulfate, boric acid, acetic acid, sodium chloride, a surfactant, and an organic sulfur-containing additive, which replaces the more commonly used saccharin. Most results were obtained at room temperature, at pH 3, in a range of current densities of 5 to 20 mA/cm². The film composition was varied mainly by changing the ferrous ion concentration. Thermal annealing was found to improve the magnetic properties, especially the coercivity.