

Fe-Co-BASED ALLOY SPUTTERING TARGET MATERIAL, SOFT
MAGNETIC THIN FILM LAYER, AND VERTICAL MAGNETIC
RECORDING MEDIUM PRODUCED USING SAID SOFT MAGNETIC
THIN FILM LAYER

5

ABSTRACT

There are provided: a Fe-Co-based alloy sputtering target material for molding a soft magnetic film, which enables stable magnetron sputtering and allows generation of particles to be suppressed; a method for producing the Fe-Co-based alloy sputtering target material; a soft magnetic thin film layer; and a perpendicular magnetic recording medium formed by using the soft magnetic thin film layer. The target material is a sputtering target material including a Fe-Co-based alloy, the sputtering target material including: at least one M element selected from Nb, Ta, Mo, and W; and the balance of one or two of Fe and Co with unavoidable impurities, and satisfying the following formula (1): $(\text{Fe}_X\text{-Co}_{100-X})_{100-Y}\text{M}_Y$ (1) [wherein atomic ratios are $0 \leq X \leq 100$ and $4 \leq Y \leq 28$], wherein a microstructure of the sputtering target material includes a phase mainly including Fe and Co and an intermetallic compound phase including one or two of Fe and Co and an M element; the phase mainly including Fe and Co is surrounded, divided, and isolated by allowing the intermetallic compound phase comprising one or two of Fe and Co and the M element to grow in a net geometry; and the number of the phases mainly including Fe and Co, isolated by the intermetallic compound phase, is 300 or more per $10000 \mu\text{m}^2$ in the sputtering target material.

FIGURE 1