Summary

[0005a] In an aspect of the present disclosure, there is provided a Cr-Si sintered body comprising Cr and Si, wherein the Cr-Si sintered body contains a crystalline $CrSi_2$ phase and a crystalline Si phase, a content of the Si phase in the Cr-Si sintered body is 40% by mass or more, a relative density of the Cr-Si sintered body relative to a true density of the Cr-Si sintered body is 95% or more, the $CrSi_2$ phase has an average crystal grain size of 40 μm or less, the Si phase has an average crystal grain size of 30 μm or less, a total content of impurities in the Cr-Si sintered body is 200 ppm by mass or less, and the impurities are composed of at least one element selected from the group consisting of Mn, Fe, Mg, Ca, Sr, and Ba.

[0005b] In another aspect of the present disclosure, there is provided a sputtering target comprising the Cr-Si sintered body as disclosed herein.

[0005c] In a further aspect of the present disclosure, there is provided a method for producing a thin film, comprising: a step of forming a thin film by sputtering using the sputtering target as disclosed herein.

Technical Problem

[0006] An object of an aspect of the present invention is to provide a Cr-Si sintered body containing Cr and Si and having high mechanical strength, a sputtering target including the sintered body, and a method for producing a thin film using the sputtering target.

Solution to Problem

[0007] The inventors of the present invention have conducted extensive studies on a process of producing a Cr-Si sintered body constituted by a chromium silicide ($CrSi_2$) phase and a Si phase in the stoichiometric composition and containing the Si phase in a specific amount or more. As a result, the inventors of the present invention have found that a Cr-Si sintered body having high mechanical strength is obtained by using a rapidly quenched alloy powder such as a gas atomized powder and completed the present invention.

[0008] Specifically, a Cr-Si sintered body, a sputtering target, and a method for producing a thin film according to an aspect of the present invention are as follows.

(1) A Cr-Si sintered body containing chromium (Cr) and silicon (Si), in which a crystal structure determined by X-ray diffraction is constituted by a chromium silicide ($CrSi_2$) and silicon (Si), a Si phase is present in a bulk in an amount of 40% by mass or more, a sintered body density is 95% or more, a $CrSi_2$ phase has an average grain size of 40 μm or less, the Si phase has an average grain size of 30 μm or less, and a total amount of impurities of Mn + Fe + Mg + Ca + Sr + Ba is 200 ppm or less.