which the hexagons of Mo atoms in two layers are regularly arranged vertically.

In the 2H crystal structure, it can be expected that a smaller crystallite size facilitates the occurrence of slippage on the contact surface.

[0053]

The conversion ratio R_C of the molybdenum trioxide particles to MoS_2 is preferably 70% or more, more preferably 80% or more, and still more preferably 90% or more because the presence of molybdenum trioxide is considered to adversely affect lubrication performance.

The molybdenum disulfide particles exhibit lubricating performance due to heating by friction by indicating a digit of the conversion ratio R_C to MoS_2 close to 100% and can provide superior lubrication properties to other molybdenum disulfide materials with which molybdenum trioxide may be produced as a by-product or in which molybdenum trioxide may be contained, and a precursor thereof.

[0054]

The conversion ratio R_C of the molybdenum trioxide particles to MoS_2 can be determined from the profile data obtained by X-ray diffraction (XRD) measurement of the molybdenum disulfide particles by a RIR (reference intensity ratio) method. The conversion ratio R_C to MoS_2 can be obtained from the following formula (1) using a RIR value K_A

of molybdenum disulfide (MoS_2) and an integrated intensity I_A of the peak in the vicinity of $2\theta = 14.4° \pm 0.5°$ attributed to the (002) plane or the (003) plane of molybdenum disulfide (MoS_2), and a RIR value K_B of each molybdenum oxide (for example, MoO_3 as a raw material and Mo_9O_{25}, Mo_4O_{11}, and MoO_2 as reaction intermediates) and an integrated intensity I_B of each molybdenum oxide (MoO_3 as a raw material, and Mo_9O_{25}, Mo_4O_{11}, and MoO_2 as reaction intermediates).

$$R_C\ (\%) = (I_A/K_A)/(\Sigma(I_B/K_B)) \times 100 \cdots (1)$$

Here, the values described in the inorganic crystal structure database (ICSD) (produced by Japan Association for International Chemical Information) can be used as the RIR values and integrated powder X-ray diffraction software (PDXL2) (manufactured by Rigaku Corporation) can be used for analysis.

[0055]

The lubricating composition according to the present embodiment preferably includes the molybdenum disulfide particles (MoS_2), but are not limited thereto. The composition may also contain molybdenum sulfide particles represented by MoS_x (X = 1 to 3) or one or more kinds of molybdenum sulfide particles represented by MoS_x (X = 1 to 3) may also be contained.

[0056]

<Method for Producing Molybdenum Disulfide Particles>

by mass or more and 10% by mass or less, more preferably 0.01% by mass or more and 10% by mass or less, and still more preferably 0.01% by mass or more and 1% by mass or less of the molybdenum disulfide particles serving as the lubricant with respect to 100% by mass of the total mass of the lubricating composition.

[0122]

The lubricating composition according to the present embodiment may further contain organometallic complex particles in the lubricating composition. This lubricating composition contains preferably 0.0001% by mass or more and 10% by mass or less, more preferably 0.01% by mass or more and 10% by mass or less, and still more preferably 0.01% by mass or more and 1% by mass or less of the organometallic complex particles with respect to 100% by mass of the total mass of the lubricating composition containing the above lubricating composition and the organometallic complex particles. Containing 0.0001% by mass or more and 10% by mass or less of the organometallic complex particles allows the friction coefficient to be significantly reduced and the low friction coefficient to be maintained over a long period of time.

[0123]

Examples of typical organometallic complexes constituting the organometallic complex particles include organomolybdenum complexes such as molybdenum dialkyl