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The properties of Mo-Cu-N, Mo-Cu-X-N(X= Ti, Zr, Si) coatings synthesized by magnetron sputtering process with single alloying targets

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In this study, we tried to deposit Mo-Cu, Mo-Cu-X-N(X= Ti, Zr, Si) thin coatings showing high hardness and low friction at low and high temperatures to reduce energy consumption and wear problems in engine parts and tools. In general, this kind of nano-composite coating is made by various processes using multiple targets such as Mo, Cu and X(X= Ti, Zr, Si). However, it is difficult to control the exact composition, homogeneous deposition of large scale specimens during the deposition with multiple targets. We wanted to create the single Mo-Cu, Mo-Cu-X(X= Ti, Zr, Si) alloying targets with the composition showing the best friction coefficient and surface hardness. Single alloying targets with the composition showing the best properties were prepared by powder metallurgy methods, such as mechanical alloying and hot pressing. Mo-Cu, Mo-Cu-X(X= Ti, Zr, Si) targets were prepared subsequently. Also Mo-Cu-N, Mo-Cu-X-N(X= Ti, Zr, Si) coatings prepared using the single alloying targets and mechanical properties were analyzed.

Keywords

Mo-Cu

Mo-Cu, Mo-Cu-X-N(X= Ti, Zr, Si)

thin film

alloying targets

friction