

MATERIALS SCIENCE

Structural, mechanical, and tribological properties of Li₂Al₂O₄ thin films

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Comprehensive structural, mechanical, and tribological properties of Li₂Al₂O₄ thin films are investigated. The films are grown on Si(100) substrates by pulsed laser deposition. The films are characterized by X-ray diffraction, scanning electron microscopy, atomic force microscopy, and mechanical testing. The films exhibit a high degree of crystallinity and a well-defined surface morphology. The mechanical properties of the films are characterized by nanoindentation, showing a high hardness and a low elastic modulus. The tribological properties of the films are characterized by ball-and-rod testing, showing a low friction coefficient and a high wear resistance. The results indicate that Li₂Al₂O₄ thin films are a promising material for tribological applications.

INTRODUCTION

The study of the structural, mechanical, and tribological properties of Li₂Al₂O₄ thin films is of great importance for the development of new materials for tribological applications. The films are grown on Si(100) substrates by pulsed laser deposition. The films are characterized by X-ray diffraction, scanning electron microscopy, atomic force microscopy, and mechanical testing. The results indicate that Li₂Al₂O₄ thin films are a promising material for tribological applications.

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... CNC a F₁C-CNC, ...
 ... CNC i CNC i CNC- ...
 ... 67. 22 a 31. 11%, ... (i, 5). B ...
 ... OMa ...
 ... CNC i CNC (A ...), ...
 ... (Fig. 3, Aa B).

... Δ ...
 ... 50-μ ...
 ... Ma ...
 ... F ...

... a 37. Ma ... A, 2, 4, A, 6 ... NC-6 ...) ... 75

... OMa ... Fig. 3A, a-
 ... CNC ...
 ... CNC- ... O ...
 ...

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$$E + F \rightarrow 2F, v_7 = k_7, k_7 = 10^3 \quad (8)$$

where $A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z$ are the species concentrations.

The A-CNC reaction is given by (E.5a-6).

$$E.1. \quad r_i = \sum_{j=1}^7 (v_j^r - v_j^f) v_j$$

where v_j^r and v_j^f are the forward and reverse reaction rates.

The A-CNC reaction is given by (E.2a-4).

The A-CNC reaction is given by (E.3).

The A-CNC reaction is given by (E.4).

The A-CNC reaction is given by (E.5).

The A-CNC reaction is given by (E.6).

The A-CNC reaction is given by (E.7).

The A-CNC reaction is given by (E.8).

The A-CNC reaction is given by (E.9).

The A-CNC reaction is given by (E.10).

The A-CNC reaction is given by (E.11).

The A-CNC reaction is given by (E.12).

The A-CNC reaction is given by (E.13).

The A-CNC reaction is given by (E.14).

DISCUSSION

The reaction network is analyzed using the following methods:

... CNCa A...
... H... A
... CNC
... CNC a ... (50).
... A/CNC...

... (i) ...
... /CNC ... 0, 0
... .5NC6(Fi, 371E) ... /C ... (0.005, 9 45 5901 ...)0. ...



Self-organization of nanoparticles and molecules in periodic Liesegang-type structures

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