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(12) **United States Patent**  
**Sakurai et al.**

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(54) **PROTECTIVE THIN FILM FOR FPDS,  
METHOD FOR PRODUCING SAID THIN  
FILM AND FPDS USING SAID THIN FILM**

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**FOREIGN PATENT DOCUMENTS**

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\* cited by examiner

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(\* ) Notice: Subject to any disclaimer, the term of this  
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(57) **ABSTRACT**

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The present invention provides a protecting film capable of preventing deterioration in adhesion and matching to a substrate (dielectric layer), and deterioration in electric insulation. The protecting film includes a film body composed of MgO or the like which is inhibited from reacting with CO<sub>2</sub> gas and H<sub>2</sub>O gas in air to prevent degeneration of MgO or the like into MgCO<sub>3</sub> and Mg(OH)<sub>2</sub>, etc. harmful to FPD. The film body is formed on the surface of the substrate, and the fluoride layer is formed on the surface of the film body. The fluoride layer is represented by MO<sub>x</sub>F<sub>y</sub> (M is Mg, Ca, Sr, Ba, an alkali earth complex metal, a rare earth metal, or a complex metal of an alkali earth metal and a rare earth metal, 0 ≤ X < 2, and 0 < Y ≤ 4), and is obtained by reaction of a gaseous fluorinating agent with MaO or the like. As the gaseous fluorinating agent, a fluorine gas, a hydrogen fluoride gas, BF<sub>3</sub>, SbF<sub>5</sub> or SF<sub>4</sub> is preferably used.

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(51) **Int. Cl.**<sup>7</sup> ..... **B32B 9/04**

(52) **U.S. Cl.** ..... **428/332; 428/336; 428/696**

(58) **Field of Search** ..... 428/336, 696,  
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**5 Claims, 5 Drawing Sheets**

