第12回知的財産翻訳検定　１級　化学　標準解答

問1

1. A method of fabricating a dye-sensitized solar cell including a first transparent substrate having a transparent electrode thereon, a semiconductor particle layer located on the transparent electrode and composed of a porous zinc oxide layer containing photosensitive dye molecules, a second substrate having a counter electrode thereon, an electrolyte layer composed of a liquid or liquid-like electrolyte and sandwiched between the semiconductor particle layer and the counter electrode, and an encapsulant encapsulating the electrolyte layer and fixing the first and second substrates, the method comprising the steps of:

performing electrodeposition on the first transparent substrate by immersing the first transparent substrate into a solution containing KCl from 75 mM to 2 M, $ZnCl_2$ from 3 mM to 15 M, and eosin Y from 100 μM to 130 μM, while oxygen is bubbled through the solution, to form a zinc oxide film on the transparent electrode; and

removing the eosin Y from the zinc oxide film to obtain the porous zinc oxide layer.

2. The method according to claim 1, wherein the second substrate comprises the same material as that of the first transparent substrate.

問2

[0002]

Petroleum-derived mineral oils have been used as base oils of lubricating oils for their availability.　In recent years, lubricating oils have been required to be used at a wider range of temperatures, to be compatible with energy-saving apparatuses, and to have less impact on the environment than before.　Mineral oils, however, cannot fulfill these requirements due to their insufficient lubricity, heat resistance, oxidation stability, low-temperature flowability, and biodegradability.　To meet the requirements, the mineral oils serving as the base oils of lubricating oils have been replaced with esters of hindered alcohols called polyol esters (POEs), which show excellent performance in terms of the above properties;

examples of the hindered alcohols include neopentyl glycol, trimethylol propane, and pentaerythritol.
[0003]

Specifically, lubricating oils for refrigerator oils are required to be compatible with chlorine-free hydrofluorocarbon refrigerants that are extensively used in refrigerators. For example, Patent Document 1 discloses a lubricating oil for hydrofluorocarbon refrigerants that contains, as a main component, an ester from a polyhydric alcohol having three or more hydroxyl groups and 15 or fewer carbon atoms and a fatty acid having 2 to 18 carbon atoms.

問3

Comparative Example 3
[0056]

$CaCO_3$ (purity: 99.5%) and Co_3O_4 (purity: 66% to 74%) were mixed in a vessel in a weight ratio of 3:1, and then mixed with $CaCl_2$ serving as a flux such that the $CaCl_2$ content in the resultant mixture was 90 mol%. The mixture was placed in an alumina crucible having a height of 70 mm and a diameter of 80 mm. The crucible was covered with an alumina disc to suppress evaporation of the flux, placed in a muffle furnace in air, and heated at 1173 K for 10 hours. The melt was slowly cooled at a rate of 1 K/h to 800 K and subsequently subjected to furnace cooling to obtain single-crystal flakes. Finally, the flakes were washed with water to remove the flux. Of these flakes, flakes with the largest quantity had dimensions of about 5 mm × 5 mm × 0.01 mm. At least 50 wt% of the single-crystal flakes had sizes larger than the openings of a 4-mm sieve defined by JIS Z8801. Thus, the intended flakes were not obtained.
[0057]

The present invention is not limited to the Examples above, and the scope of the present invention is defined by the Claims below.