Fluorine compounds having both a hydrofluoroether group and a reactive group have been used extensively as antifouling agents for hard coating agents.

A hard coating agent is a coating agent for the purpose of preventing scratches on various surfaces. After coating, this coating agent is cured by UV irradiation to form a film.

A fluorine compound having both a hydrofluoroether group and a reactive group is used by being added to the hard coating agent.

After coating, the hard coating agent to which this fluorine compound is added exhibits both the function of preventing stains such as fingerprints, water stains and adhesives, and the function of low friction.

Oil repellency and a low coefficient of friction are required to prevent fingerprints and smudges. There is no substitute substance because there is no oil-repellent substance other than fluorine-based compounds in the world. (table 1)

table 1

compound name	oil repellency (hexadecane contact angle)
The fluorine compound	69°
silicon compound	15°
Urethane compound	Not measurable (contact angle of 10 degrees or less)
acrylic compound	Not measurable (contact angle of 10 degrees or less)
epoxy compound	Not measurable (contact angle of 10 degrees or less)
polyethylene	Not measurable (contact angle of 10 degrees or less)
polypropylene	Not measurable (contact angle of 10 degrees or less)
ABS	Not measurable (contact angle of 10 degrees or less)
Nylon 66	Not measurable (contact angle of 10 degrees or less)
Polyimide	Not measurable (contact angle of 10 degrees or less)
polyamide	Not measurable (contact angle of 10 degrees or less)

Also, the fluorine compound has an optically low refractive index.
Reflected light can be reduced by coating optical parts such as lenses and transparent films with a hard coating agent containing a fluorine-based compound to a thickness of about 0.1 μ m. Reducing reflected light results in a 3-5% improvement in transmitted light

transmittance. Other various resins have a high refractive index and cannot achieve such a reflected light reduction rate.

compound name	refractive index
Fluorine compound	1.35
Polycarbonate	1.59
PET	1.66
PMMA	1.49
polystyrene	1.66
silicon resin	1.43

Light transmittance (by wavelength) when glass is coated with a fluorine compound