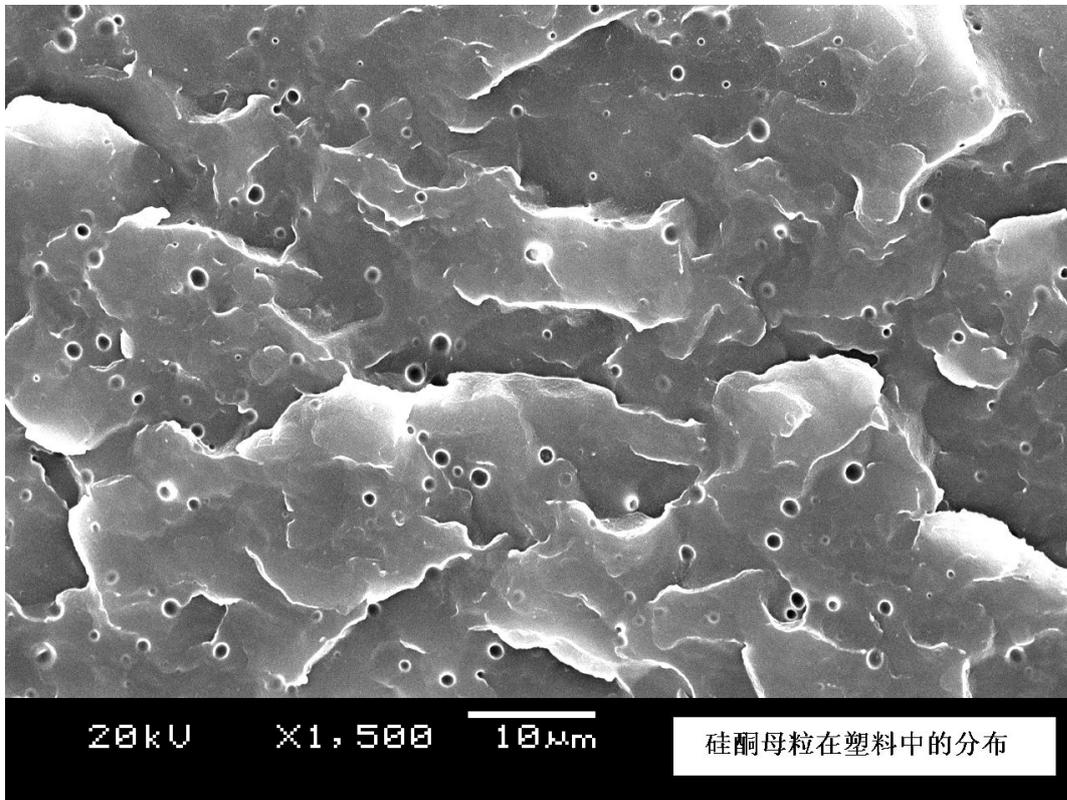


## Chengdu Silike

SILIKE® is a manufacturer and supplier of Silicone additives, including silicone masterbatch, silicone powder, silicone flame retardant synergist, silicone molding , super-slip masterbatch and anti-wear agent for plastics and thermoplastics

What's Silicone masterbatch?

Silicone masterbatch is a kinds of function masterbatch formed by Ultra High Molecular Weight siloxane polymer dispersed in thermoplastic resin such as PE,PP,ABS~~~its non-polar with low surface energy (about 21 to 22 dyne/cm), so When added in plastic its has a tendency to migrate to the plastic surface during melting process; while, since it has a large molecular weight, it can't move out completely. So there is a dynamic lubrication layer formed between plastic surface and screw. With the processing going on , this lubrication layer continuously being taken away and produced. So the flow of resin and processing are getting improved,



Above is a picture of siloxane of silicone masterbatches distributed in plastic under microscope, we can see the siloxane of silicone masterbatches can homogeneous distribute in plastics and form a 1 to 2 micron oil particles, it is those oil particles which offer the products better surface quality, including nice hand feeling, lower COF and greater abrasion and scratch resistance.

Benefits of silicone masterbatch

1) Dosage at 0.5~2%, Improve the flow and processing of resin , including better mold filling, mold release reduce waste, Less extruder torque, reduce energy consumption, Fast



throughput = Improve throughput.

- 2) Higher addition level, about 2~5% Modify surface properties, including improve lubricity, slip properties lower COF, enhance scratch and abrasion resistance
- 3) Better heat stability than traditional processing aids and lubricants
- 4) Non-migration
- 5) Eco-friendly material

### Typical applications

#### Application in cable compounds

##### A. HFFR cable compounds

ATH/(AL(OH)<sub>3</sub> & MDH/Mg(OH)<sub>2</sub> widely used as flame retardant in HFFR/LSZH cable compounds, due to a big addition (usually 55-70%), the flow of resin and processing will be deteriorated, friction between the fillers generate heat may cause the decompose of ATH (150°C) and instability during extrusion, and the poor dispersity of flame retardant fillers will cause defects on the surface of cable. A small dosage of silicone masterbatch can significantly improve processing, flow, surface, and mechanical properties, reduce deposits on the die and in the extruder and flame-retardant properties are synergistically improved

##### B. Application in Silane cross-linked cable compound

The linear structure of LLDPE will turn into net structure after Silane-grafting and cross-linking reaction, in this way the flow of resin become bad, the compounds are easily adhere to screw groove and mold dead corners and form dead mass which will affect the extruded cable appearance (rough surface with little pre-crosslinking particles which formed at cross-linking step) so we need a kinds of lubricant to improve the flow of resin and processing.

##### C. Application in Low smoke PVC cable compounds

High content of flame retardant fillers (ATH & MDH), the flow of resin and processing will be deteriorated, friction between the fillers generate heat which will increase the temperature and cause the decompose of ATH & PVC and unstable during extrusion, and the poor dispersity of flame retardant fillers will cause defects on the surface of cable. A small dosage of silicone masterbatch can significantly improve processing, flow, surface, and mechanical properties, reduce deposits on the die and in the extruder and flame-retardant properties are synergistically improved

##### D. Application in TPE wire

For good quality TPE wire have a high requirement on the surface quality especially nice hand feeling, and its a kind of fine wire and the pay-off speed is very fast, so the wire will suffer a big shear force at the extruder die which will easily cause melt fracture a small dosage of silicone masterbatch will improve the flow of resin and processing higher the pay-off speed, offer a nice hand feeling and its non-migration.



## E. Application in U-PVC

As we know, the flow of U-PVC is poor for a small dosage of plasticizer, so during processing PVC might adhere to the screw which will easily decompose and generate HCL which will corrode the mold. Small dosage of Silicone Powder can improve the flow of resin and processing, reduce the contact time with extruder screw, so that reduce the risk of thermal decomposition and extend mold's life

## Application in Automotive PP/TPO/TPV/TPE compound

Automotive PP compatible system compounds like TPE, TPV compounds, automobile interior trims compounds ( PP,TPO) have a high requirement on anti-scratch resistance ..... Our Anti-scratch masterbatches are developed for those compound to improve their anti-scratch property such as auto interior trims, seals, bumper, household appliance, electronics.A small dosage can obviously improve the scratch & abrasion resistance and free -spraying.compared with traditional additives they are cost saving and Eco-friendly

## Application in pipe

### A. Application in silicon core pipe

Silicon core pipe which was also called cable protection sleeve,we use compressed air to move the optical cable,and the distance can up to 2000 meters, so a low COF is a must for this kind of pipe.our product LYSI-404 is very suitable for this requirement and at dosage of 1.5-5% will meet the requirement(different dosage for different requirement) according our Chinese clients' experience, the COF is about 0.25 without silicone masterbatches, once you add 2% silicone masterbatches the COF can decrease to 0.15.

### B. Application in large diameter pipe

For large diameter pipe have a large diameter,so have high requirement on the equipment. During processing, Extruder torque, strong electric current and high pressure can easily cause damage for mold and equipment.only 0.3-1% of our product can improve processing, reduce pressure, prolong equipment's life and increase efficiency

## Applications on Engineering plastics

silicone masterbatches wildly used in engineering plastics for improve the flow of resin , processing and modify surface properties

For example

For glass-fiber products, reduce fiber exposed

for high content fillers products, improve the processing and surface properties

for high demand on anti-scratch products(if use traditional product teflon the dosage is 5-10% while our product is 2-5%)

used in large thin-wall injection molding products (for improving the flow of resin)

Used in automobile interior parts to improve surface properties and enhance anti-scratch properties

Used in the shell of house appliances, phone, table PC for improve anti-scratch properties.

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Used in the package of cosmetics and daily necessities to improve the surface properties and hand feeling

Used in high temperature plastics(eg:PPS)to improve the flow of resin and processing(because the processing temperature is high, normal lubricant already decomposed at this temperature)

Used in color masterbatches to improve the pigment disperisbility

#### Application in film

Silicone masterbatches are effectively to improve the slip ,anti-blocking and lower the COF of plastic film ,compare with traditional lubricant such as amide, it has outstanding low and high temperature slip , no smell ,no bleeding on surface and and safety with food contact(EU FCA).wildly used in BOPP,CPP,BOPA,BOPET,milk film etc; Meanwhile, it will shows very good anti-blocking and smooth properties for those sticky film like TPU/EVA/TPE when used with inorganic anti-blocking agent .

#### Application sample: Cigarette package film

Due to the speed of cigarette package production line is very fast which leading a large fraction between film and roller surface and usually the temperature is higher than 50 degrees, so normally low molecular weight slip agent easily migrate which can not be used.while silicone has good high slip peroperty, can effectively lower the COF between film and roller surface.and make sure the equipment can work smoothly

B. Food package film: silicone is safety contact with food without any bleeding which is able to used in food package film to lower COF, facilitate to film rolling, filling and high-speed packaging

C. Daily necessities package film : Silicone has been used in part of high-end daily necessities package because it can obviously improve the surface finish and hand feel of film

#### D. TPU and EVA film:

TPU and EVA resin are very sticky with poor anti-blocking property, particularly for those thin film are easier to face this problem. at present , the main solution is use amide with inorganic anti-blocking agent, although the anti-blocking and smooth properties will be improved while we need face migration problem.our super-slip masterbatches can effectively solve this problem and offer better smooth and anti-blocking property, but it will affect on transparency.

Notice: Due to the refractive index of silicone is different with most resin, so even a small dosage of silicone will affect the transparency of film. but we can reduce the affect by adjust the thickness of film.Take cigarette film as example, we only use silicone in it's top layer which is just 1-2 micron, so almost no affect on transparency. Dosage:2-3%

#### Application on plastics sheet

Improve smooth, anti-scratch and anti-adhesion properties, lower COF and reduce burrs as well



Application sample: PET/PS sheet

Notice: silicone has affects on transparency

Application in fiber

Silicone can improve the processing ,reduce broken ends, improve smooth,hand feeling, abrasion resistance,lower COF. Suitable for spandex/PP/PA/PE/PET/PVC

Typical application: industrial yarn products which need low COF or better abrasion resistance like artificial lawn

Products which have high demand on smooth (eg: hairpiece )

ultra-thin non-woven fabrics to improve smooth and hand feeling

Chose suitable grade according the carrier resin

Application in shoes' sole

Usually used in outsole and ladies' High heel's heel, refer to TPR,EVA,PVC and TPU, most are TPR and EVA.. commonly used abrasion resistance test for shoes material, eg. DIN/NBS/China national standard.no matter which way you used, the abrasion resistance will have a significant improvement.

Notice, the material should be mixed as evenly as possible when the products added and regulate the technological parameter according the characteristics of material in order to avoid side effect on other properties.

Application in TPR

When added in TPR and TR the abrasion resistance will improved significantly

Application in EVA outsole

Foamed EVA usually used in sports shoes, if without silicone masterbatches the abrasion resistance will very bad. silicone masterbatches was used to improve the abrasion resistance and it has become the common way in this industry

Application in rubber outsole

Two ways are usually used in rubber outsole to improve the abrasion resistance: one is add carbon black,this measure widely used in rubber products,such as tyre, conveyor belt, the advantage is it can not only improve the abrasion resistance but also improve the mechanical property,but the weakness is it can only been used in black products.the second way is use coupling agent,such as Si69,to improve the cohesion between fillers and rubber,thus improve the abrasion resistance.but in this way the hardness of products will improved. Our products NM-3 can improve the abrasion resistance and no side effects on the hardness and color.

Application in Flexible PVC

As we know the processing and flow of Flexible PVC is good enough, but silicone masterbatches are being used for improve abrasion resistance.

Typical application of following grade

LYSI-401

A. application in HFFR polyolefin cable compound: LDPE/ATH、EVA/ATH etc , XLPE(Silane

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cross-linked PE)

- B. Silicon core HDPE pipe(pipe used in telecommunication)
- C. Milk package film
- D. Package bottle(surface properties)
- E. Artificial turf for abrasion resistance

LYSI-402

- A. application in HFFR polyolefin cable compound: LDPE/ATH、EVA/ATH etc
- B. EVA film (improve smoothness)

LYSI-03 for modified plastics such as PET, PBT(mold release,anti-abrasion,surface slip,and anti-scratch), slip properties for film

LYSI-04 silicon core pipe (lower COF of the inner layer), package boxes, bottle (surface smoothness)

LYSI-405 improve the flow of ABS, PC/ABS, smooth surface, anti-scratch properties(TV,LED shell)

LYSI-406

- A. PP package box for surface smoothness
- B. The smoothness of BOPP、CPP film(good heat smooth properties)

LYSI-306 improve the anti-scratch and surface properties of automobile Interior(PP/Talc), TPO

LYSI-07/407 for modified plastics(flow, mold release, and surface properties)

LYSI-08/408 improve PET surface smoothness and anti-scratch etc

LYSI-09 /409 improve TPU film slip and abrasion resistance. Improve TPU abrasion resistance.

LYSI-10 /410 improve HIPS, PS sheet slip properties(Transparency will be effected)

LYSI-300C used in engineering plastics

Any questions please feel free contact me.

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