

P(VDF-TrFE) Copolymer Contamination Clearance Chemical Safety Approval

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INUP Users



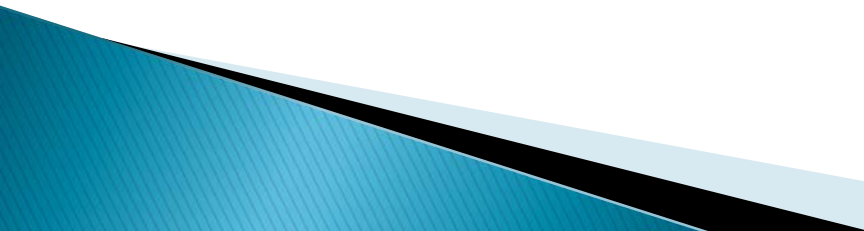
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About the Chemical

- ❖ P(VDF-TrFE) is a copolymer which contains 75% by moles of Vinylidene fluoride and 25% by moles of trifluoroethylene
http://www.solvayplastics.com/sites/solvayplastics/EN/Solvay%20Plastics%20Literature/Solvane-EAP-for-Printed-Electronics_EN.pdf
- ❖ PVDF (Poly Vinylidene fluoride) is a stable material and already approved by the safety/contamination officials of INUP-IITB to use in the IITB-NF Lab.
- ❖ **P(VDF-TrFE) will be used in solution form by dissolving the same using DMF as solvent and will be spincoated on silicon wafer.**
- ❖ P(VDF-TrFE) in which bond is formed in between Vinylidene fluoride and trifluoroethylene and forms a copolymer.

Chemicals to be Used

- ❖ Poly(vinylidene fluoride – TriFluoroethylene)
 - ❖ **P(VDF-TrFE) will be used in solution form by dissolving the same using DMF as solvent and will be spincoated on silicon wafer.**
 - ❖ Chromium Cr, Gold Au,
 - ❖ DMF, TMAH, PPR Stripper
 - ❖ Positive Photoresist
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Overview of Process

- RCA cleaning (2 inch silicon wafers)
- Spin P(VDF-TrFE) dissolved in Dimethylformamide (DMF) solvent and post bake
- Spin photoresist PPR, Pre-bake, expose mask 1: MJB4 for contacts and develop
- Develop and deposit Cr/Au (20 nm Cr+ 150nm Au) using Cr/Au Evaporator
- Lift off using stripper followed by rinse with DI Water
- Spin photoresist PPR, Pre-bake, expose mask 2: MJB4 for cantilevers and develop
- Etch P(VDF-TrFE) using DMF
- Etch silicon using TMAH at 80°C depth 200 micron
- Rinse and dry carefully

HAZARDS IDENTIFICATION

Appearance : powder
Colour : white
Odour : odourless

- Substance non classified according to Directive 67/548/EEC.
- The product is biologically inert.
- Not hazardous in normal conditions of handling and use
- Ecological injuries are not known or expected under normal use.
- Thermal decomposition can lead to release of toxic and corrosive gases.

COMPOSITION/INFORMATION ON INGREDIENTS

Substances

Chemical nature : Fluoropolymer resin

Chemical Name	Identification number	Concentration [%]
Copolymer of trifluoroethene and 1,1-difluoroethene	CAS-No.: 28960-88-5	> 99.9 %

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

Mixtures

Not applicable, this product is a substance

FIRST AID MEASURES

Inhalation

- Remove the subject from dusty environment and let him blow his nose.

Exposure to decomposition products :

- Move to fresh air.
- Oxygen or artificial respiration if needed.
- Symptoms of poisoning may develop many hours after exposure.
- Keep under medical supervision for at least 48 hours.

Eye contact

- In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Exposure to decomposition products :

- Rinse immediately with plenty of water, also under the eyelids.
- Remove contact lenses.

Skin contact

- Wash off with soap and water.

Exposure to decomposition products :

- Wash off with soap and water.
- Immediately apply calcium gluconate gel 2.5% and massage into the affected area using rubber gloves; continue to massage while repeatedly applying gel until 15 minutes after pain is relieved.
- Consult a physician.

Ingestion

- If large quantities of this material are swallowed, call a physician immediately.
- Never give anything by mouth to an unconscious person.

FIRE-FIGHTING MEASURES

Suitable extinguishing media

- Water
- powder
- Foam
- Dry chemical
- Carbon dioxide (CO₂)

Extinguishing media which shall not be used for safety reasons

- None.

Special exposure hazards in a fire

- The product is not flammable.
- Not explosive
- In case of fire hazardous decomposition products may be produced such as: Gaseous hydrogen fluoride (HF), Fluorophosgene

Special protective equipment for fire-fighters

- Wear self-contained breathing apparatus and protective suit.
- When intervention in close proximity wear acid resistant over suit.

ACCIDENTAL RELEASE MEASURES

Personal precautions

- Ensure adequate ventilation.
- Avoid dust formation.
- Material can create slippery conditions.
- Sweep up to prevent slipping hazard.
- Prevent further leakage or spillage if safe to do so.
- Keep away from open flames, hot surfaces and sources of ignition.
- Refer to protective measures listed in sections 7 and 8.

Environmental precautions

- Should not be released into the environment.
- Do not flush into surface water or sanitary sewer system.

Methods for cleaning up

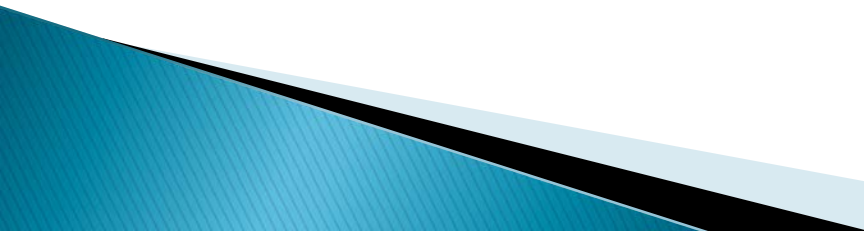
- Sweep up or vacuum up spillage and collect in suitable container for disposal.

HANDLING AND STORAGE

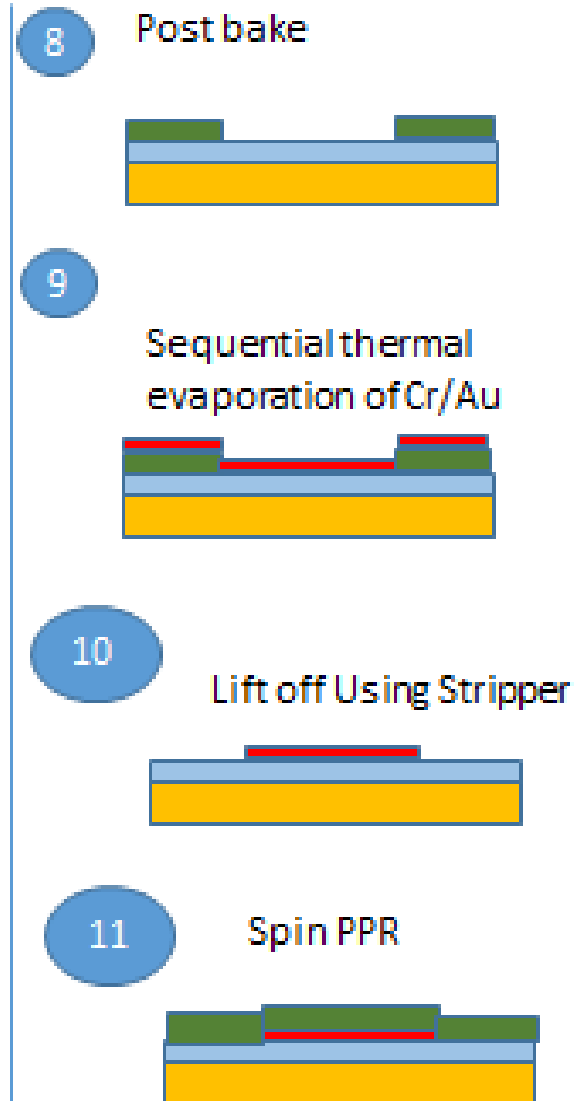
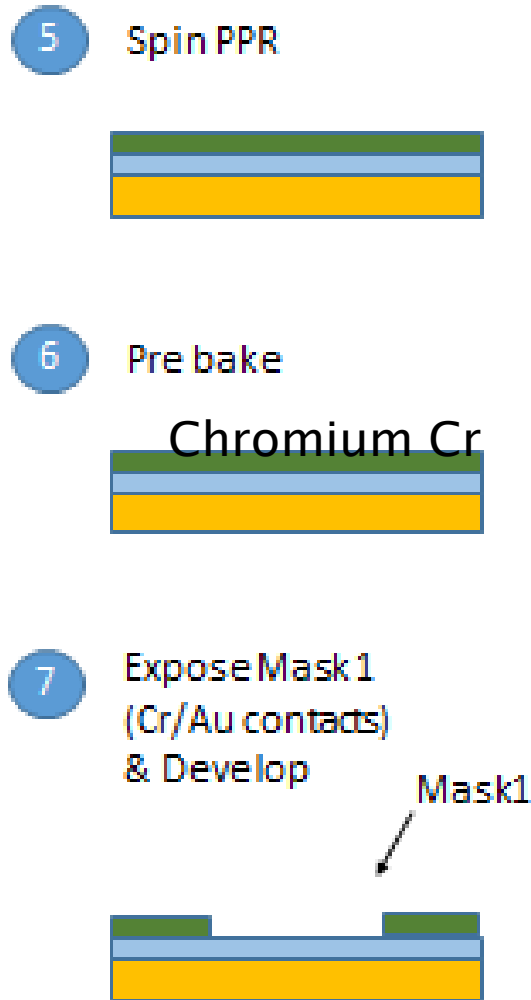
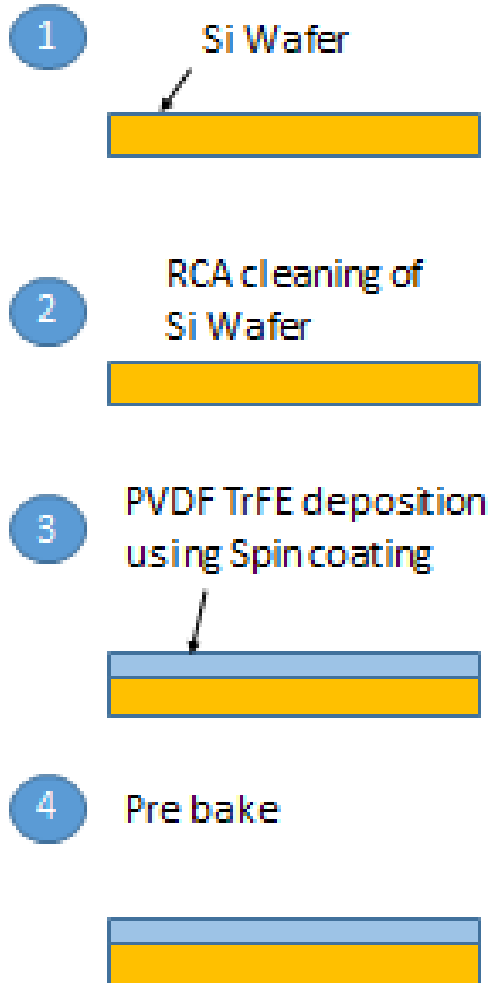
Handling

- No special handling advice required.
- Ensure adequate ventilation.
- Avoid dust formation.
- Use personal protective equipment.
- Do not contaminate tobacco products.
- Keep away from heat and sources of ignition.
- To avoid thermal decomposition, do not overheat.
- Take measures to prevent the build up of electrostatic charge.
- Clean and dry piping circuits and equipment before any operations.
- Ensure all equipment is electrically grounded before beginning transfer operations.

Storage

- No special storage conditions required.
 - Keep in properly labelled containers.
 - Keep away from heat and sources of ignition.
 - Keep away from combustible material.
 - Keep away from Incompatible products.
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Process Flow



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Pre bake



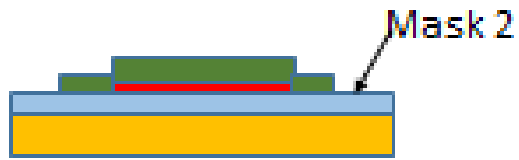
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Expose Mask 2 (Cantilevers) & Develop



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Post bake



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Etch P(VDF-TrFE)



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Etch Silicon with TMAH



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Etch Silicon with TMAH to float cantilever



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PPR Strip

Cantilever



THANK YOU