Last Update: 22 March 2023

2D Heterostructure Preparation

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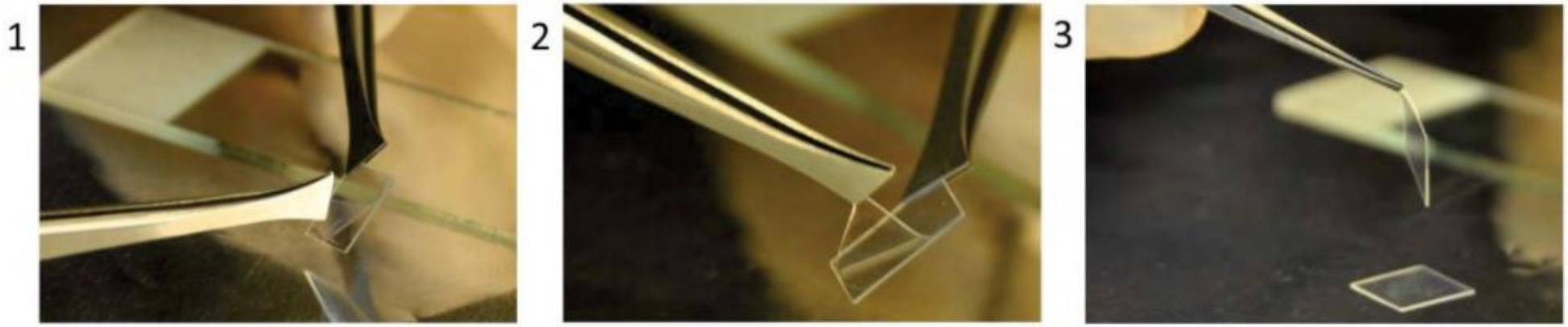
Stamp Preparation

A. Prepare PDMS stamp

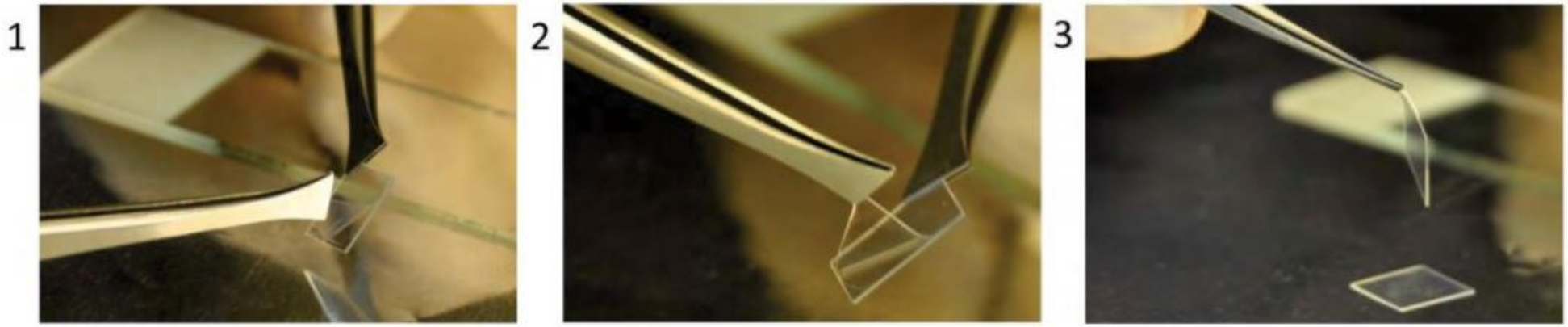


- Material ($ 120)
  - PDMS material - Sylgard 184 (Dow Corning, USA), $ 45
  - PPC material - Propylene carbonate (Sigma-Aldrich, CAS 25511-85-7) $ 75

- Equipment ($ 306, used for releasing bubbles inside PDMS to reduce surface roughness)
  - Vacuum Desiccator (Southern Labwaer) $ 56
  - Oil free vacuum pump (Rocker) $ 250

Stamp Preparation

A. Prepare PDMS stamp



- PDMS preparation
  - Prepare the pre-polymer base without bubble (Under vacuum condition for 0.5 hour)
  - Mix pre-polymer base and cross linking curing agent (10:1~15:1)
  - Pour the mixed solution in the container
  - Bubble releasing (Under vacuum condition for 1 hour)
  - Cure the solution for 4 hour, 4 C

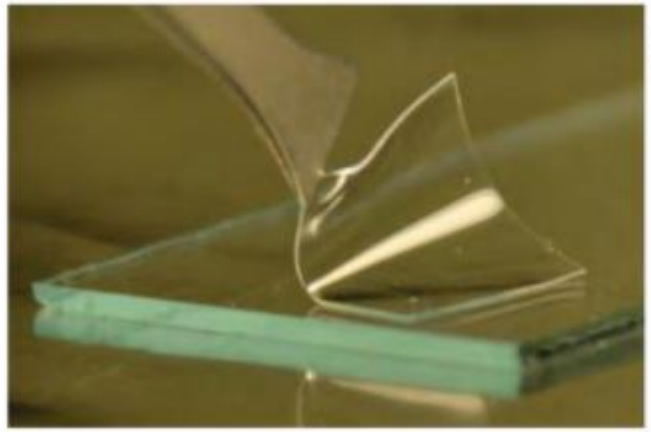
  - If the surface of the stamp is not clean enough => Plasma treating

- PPC preparation
  - Coat the surface of the stamp

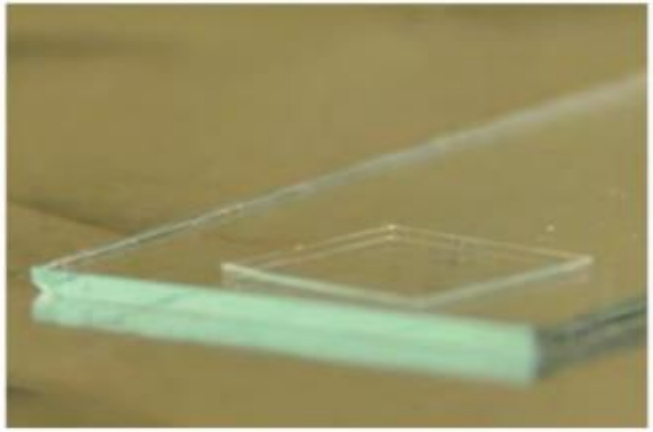
Stamp Preparation

B. Attach the stamp on the glass

1

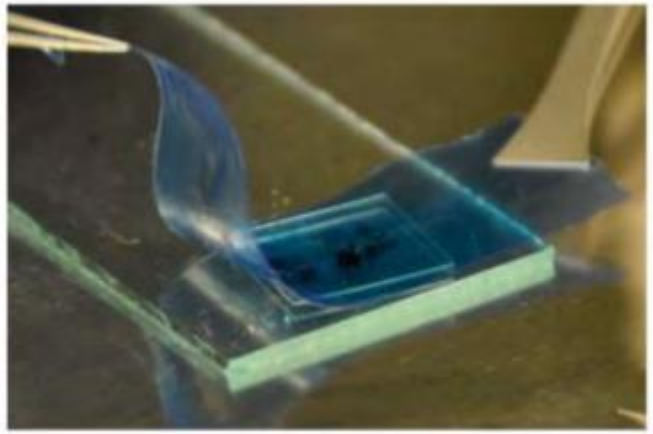


2

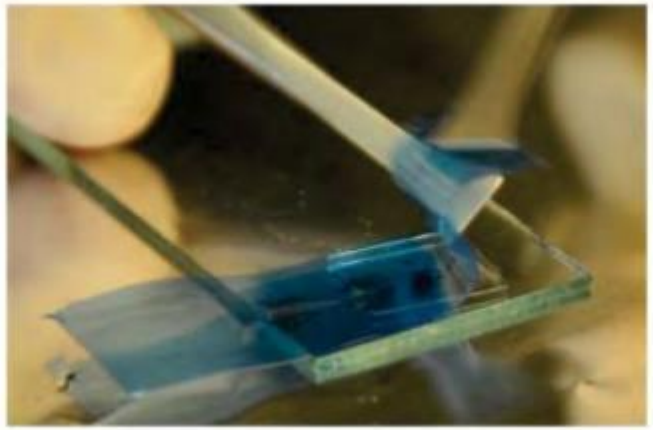


C. Transfer TMDC flakes on the stamp

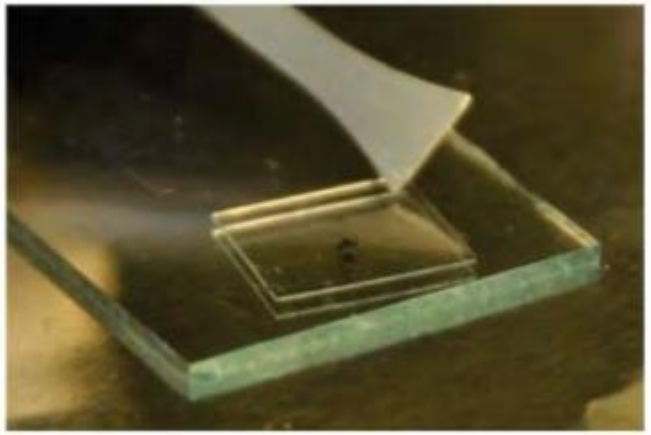
1



2

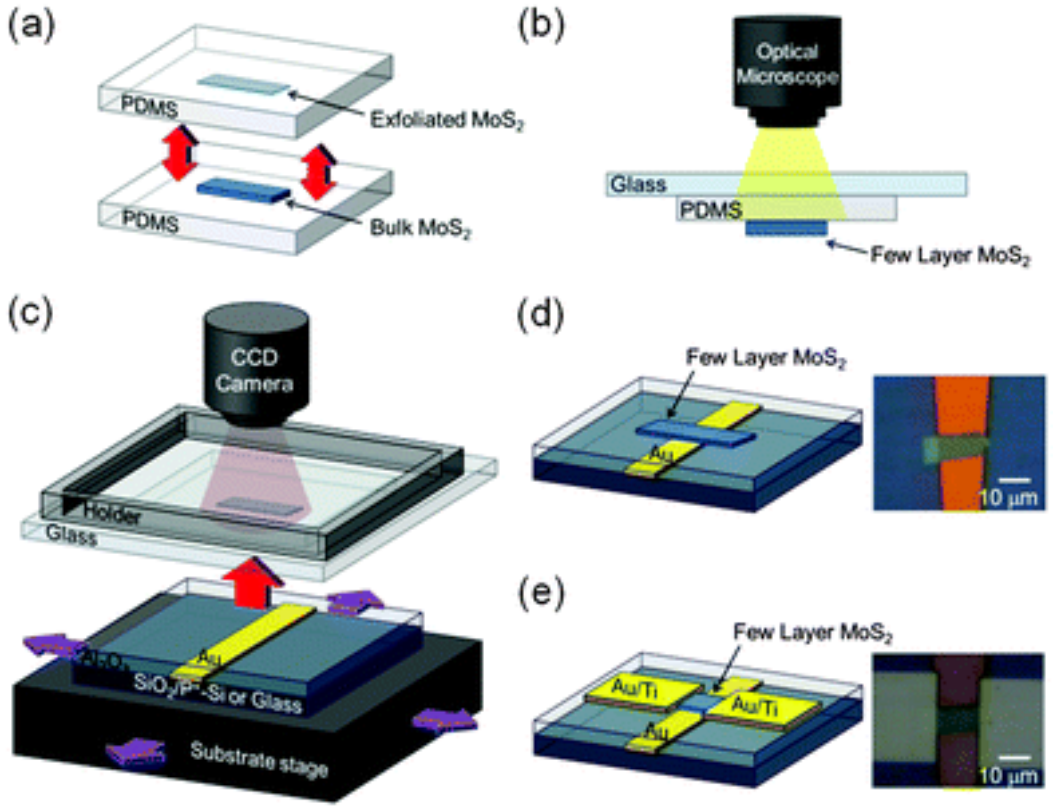


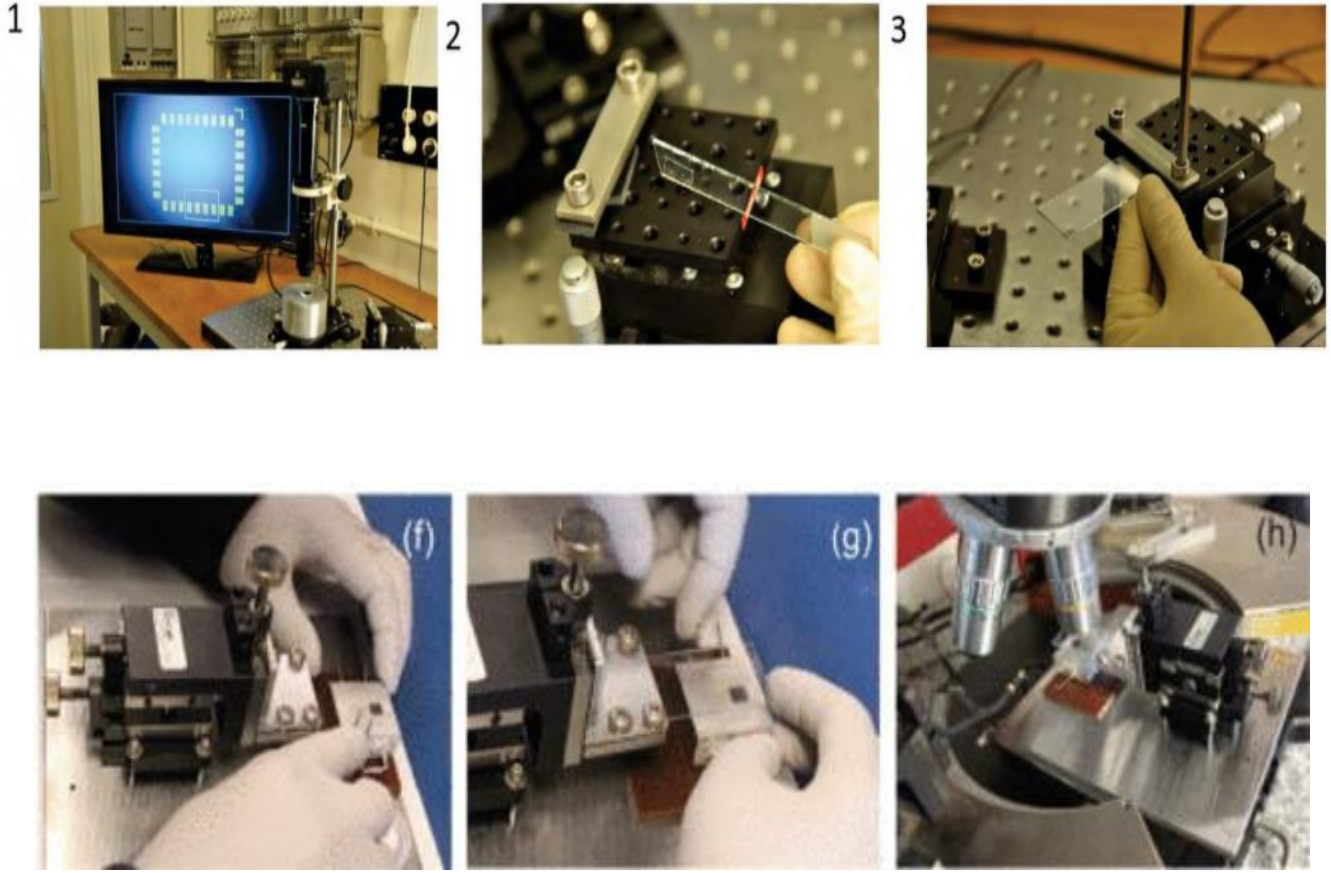
3



Transfer method using micromanipulator

D. Transfer TMDC flakes on the substrate using micromanipulator and optical camera

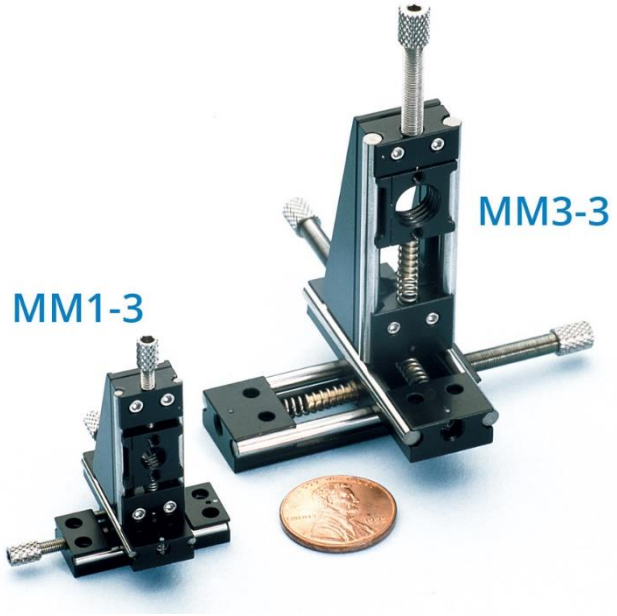




Transfer Equipment

- Optical scope (AMScope, $850)

Micropositioner



- up to 225x magnification
- Have to find fairly large flakes
- Ask the provider whether we can get more high magnification range.

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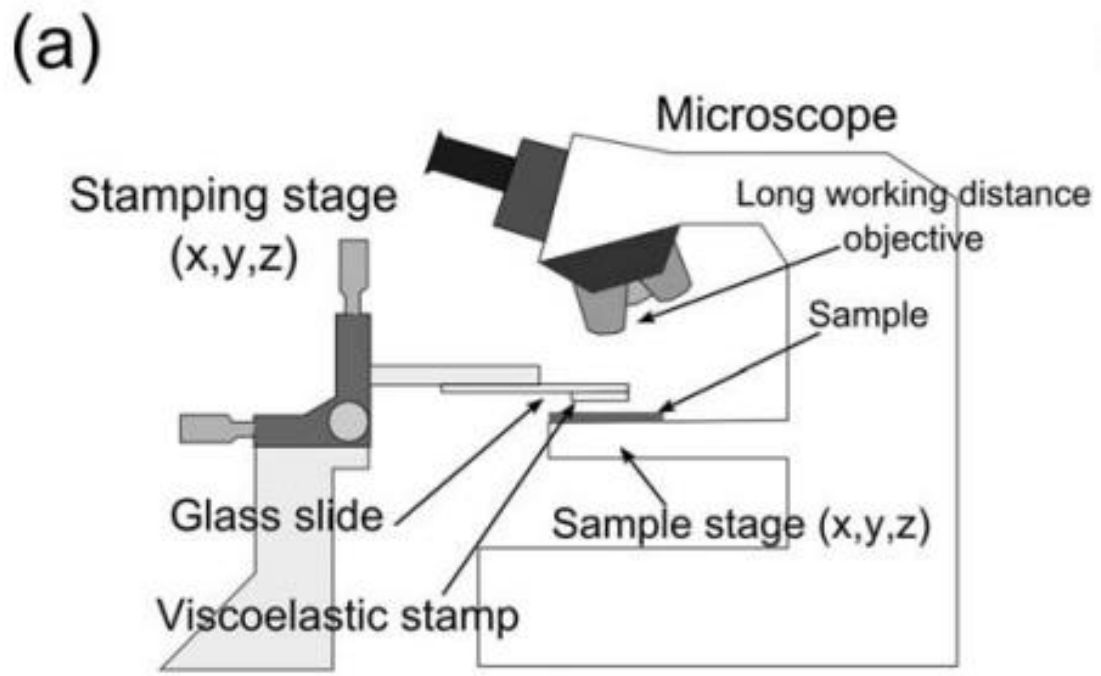
Transfer Equipment

(a) Using Long Working Distance Objective



Objective – too expensive

+1	Qty	Docs	Part Number - Price		Available / Ships	
+1			MY5X-802	$695.00	√	3-5 Days
+1			MY10X-803	$873.00	√	Today
+1			MY20X-804	$2,056.00	Lead Time	
+1			MY100X-806	$3,467.00	√	3-5 Days

Micropositioner