

# How to prepare AFM tip bundle (tip + ceramic plate)<sup>1</sup>

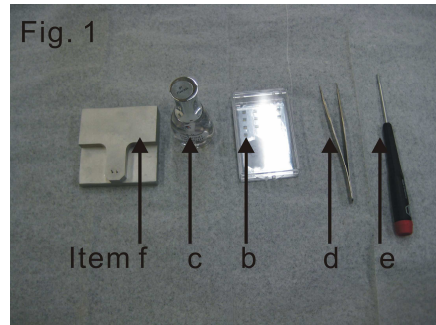
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## **Goal:**

To assemble an AFM tip bundle by using an AFM tip on a holder chip and a used ceramic plate, so that it is compatible with the Autoprobe CP AFM.

## **Main Materials and tools:**

- a. Used ceramic plates
- b. AFM tip on a holder chip (see fig. 1)
- c. Fingernail polish<sup>2</sup> (see fig. 1)
- d. A tweezer for grabbing tips (see fig. 1)
- e. A screwdriver with small flat head<sup>3</sup> (see fig. 1)
- f. A stage for placing the ceramic plate (optional, fig. 1)



## **Procedure:**

Step 1. Use Acetone to clean ceramic plates (item a), the tweezer (item d) and the screwdriver (item e) in the ultrasonic unit for about 5 minutes. Make sure that glue on ceramic plates is completely removed.

Step 2. Study an existing AFM tip bundle (with ceramic plate), and understand where the tip cantilever should be placed on the ceramic plate.

Step 3. Place a clean and dry ceramic plate (item a) on the clean stage (item f). Drop a small amount of fingernail polish (item c) on the ceramic plate (item a). Carefully grab and place the metal holder chip of the tip (item b) on the ceramic plate by using the tweezer with sharp end (item d). The small amount of fingernail polish should just surround the edge of the holder chip, but not over its top surface

Step 4. Use the screwdriver with flat head (item e) to push firmly the tip holder chip against the ceramic plates for 10 minutes, so that the holder chip and the ceramic plate are parallel to each other and firm. Fig.2 shows how an assembled AFM tip bundle looks like.



Step 5. Test the tip bundle in the Autoprobe CP. After laser is well aligned for a good tip bundle,  $|A-B|$  value will be stable within 50 mV, before the AFM head starts approaching, and during the AFM head is moving toward the sample, but outside the contact range.

<sup>1</sup> There is a sample box labeled with “practice tip”. It would be better if one practices the whole procedure by using the used tips in this box before using a new tip.

<sup>2</sup>Recommendation: Sally Hansen Diamond Strength Nail Color Flawless; item no. 074170241877; price: about \$4.

<sup>3</sup>The screwdriver for adjusting laser alignment can work.