March, 2007

UYEMURA
Japan

New Immersion Tin Process

PRESA® RMK-30

Tin Whisker Issue

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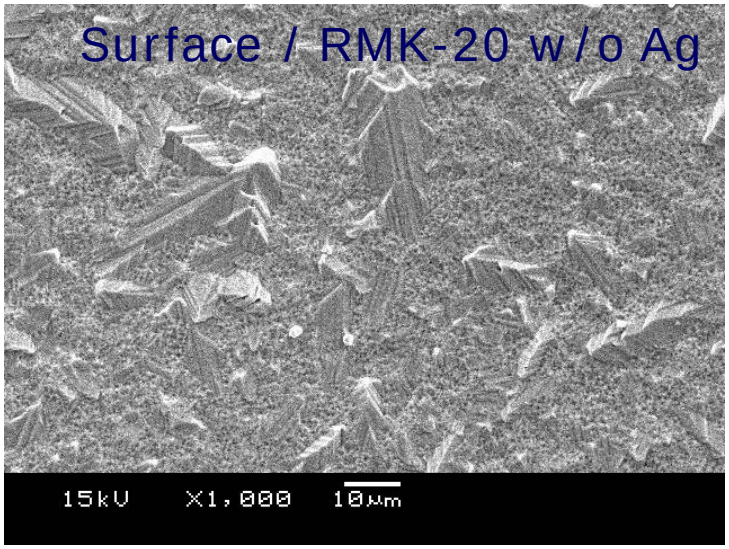
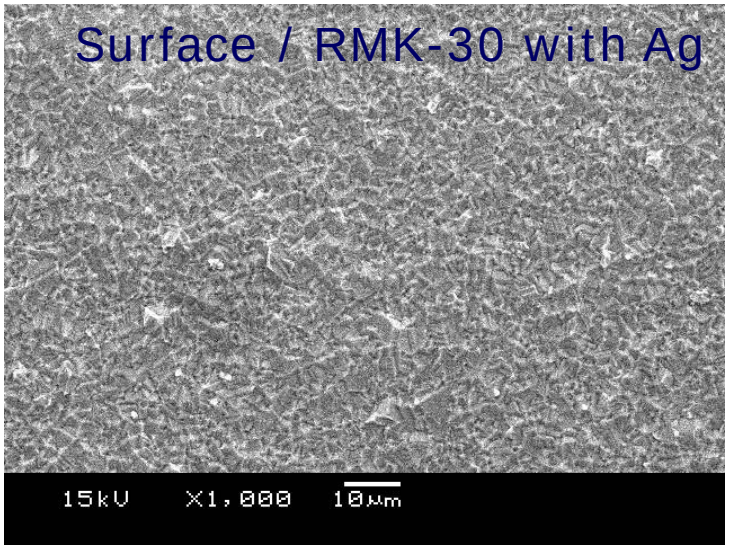
Preventing Tin Whisker

It is well-known that whisker is easily generated on tin coating. Many studies about tin whisker were done, and it is generally understood that diffusion layer (Cu_6Sn_5) between copper and tin layers generates internal compressive stress and influences tin whisker growth. When the other metal is included within tin coating, also it is well-known to prevent tin whisker growth. Especially silver is most effective for whisker.





Tin Whisker Evaluation

Test Method

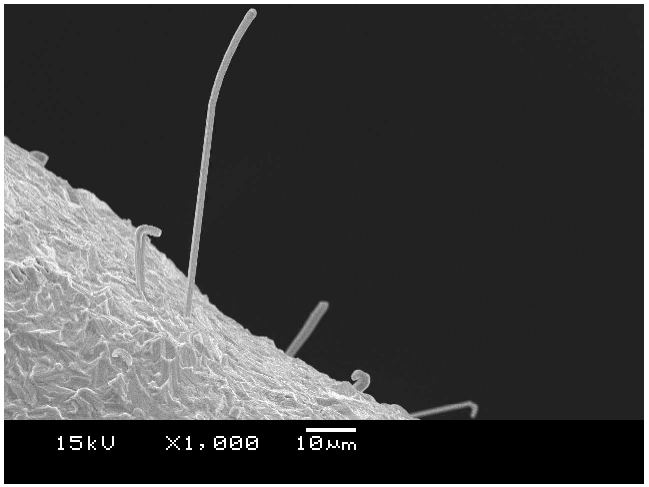
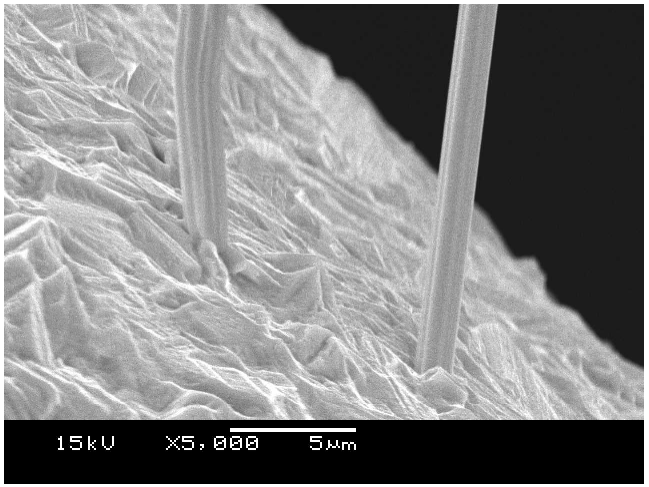
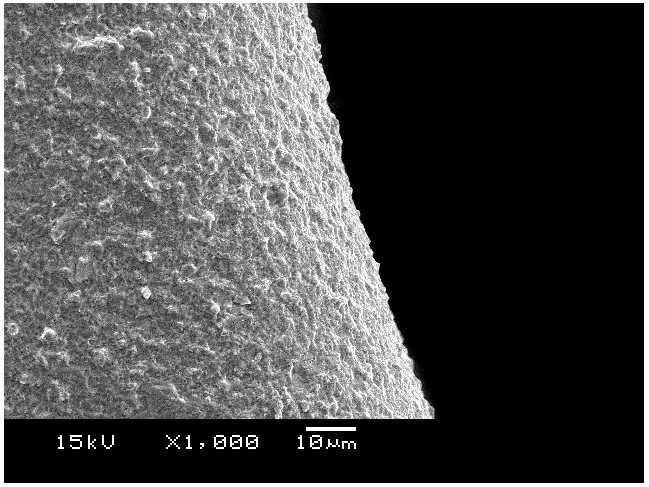
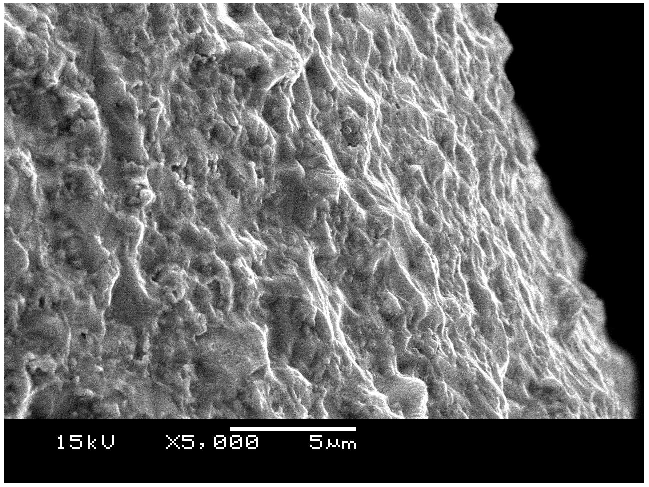
- Room temperature / 30 deg.C
- Office environment / 60 %RH
- Evaluating period / 3000 hours (125 days, 4 months)
- Substrate / PWB with PTH
- Inspection / inner wall of PTH by optical scope or SEM

Result

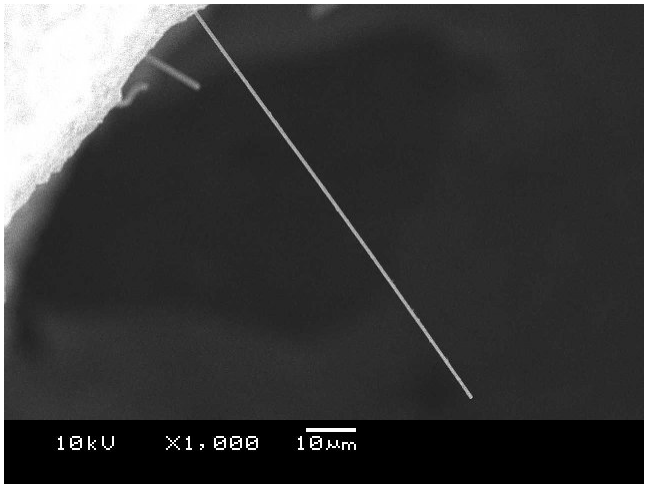
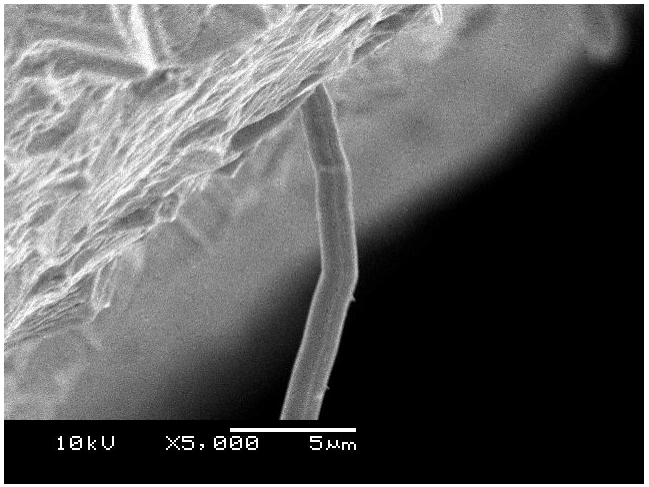
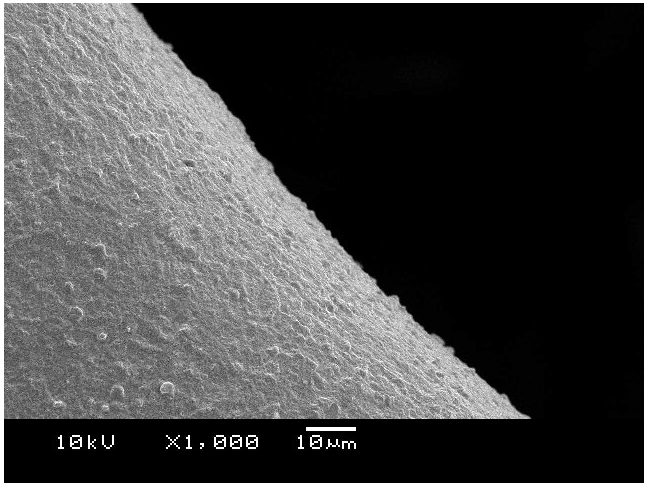
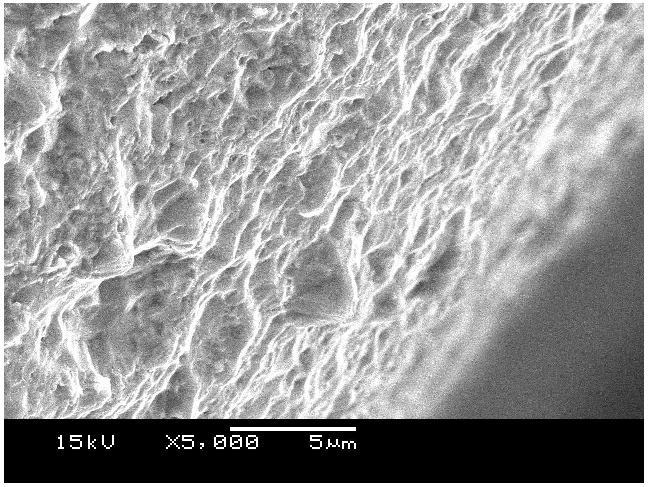
	1w.	2w.	1mo.	2mo.	3mo.	4mo.
RMK-20 (w/o Ag)	OK	NG				
RMK-30 (with Ag)	OK					

Note) w./week, mo./month, OK/no whisker, NG/one or more tin filament

Whisker test / 3000hrs (4 months)

	x1000	x5000
RMK-20 (W/O Ag)		
RMK-30 (with Ag)		

Whisker test / 4500hrs (6 months)

	x1000	x5000
RMK-20 (W/O Ag)		
RMK-30 (with Ag)		

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Conclusion

- When silver was co-deposited with tin, the alloy was effective in preventing tin whisker growth. Tin coating with silver provided smooth surface without typical tin crystal. (See photographs in page-2.)
- No tin whisker was found on RMK-30 coating (including silver) after 6 months aging.
- When Ag content in tin film is more than 0.5%, tin whisker isn't found on RMK-30 film.