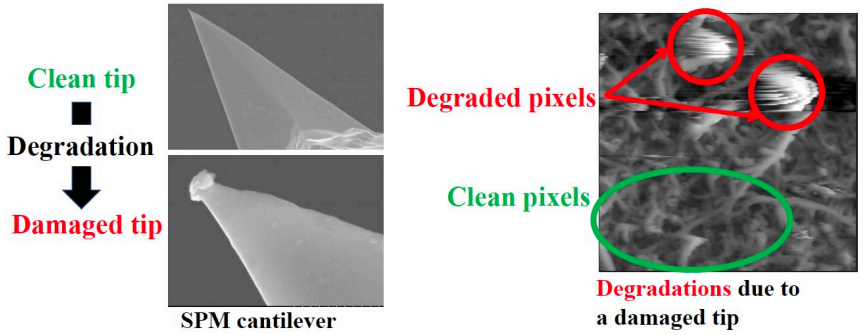
2nd スマート情報研究センター　シンポジウム　研究報告

豊田工大　表面科学研究室　吉村雅満、原 正則、永田裕暉(M1)、三星 響(M1)

顕微鏡画像の劣化復元（TTI浮田研との共同研究）



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Neural image enhancement and restoration for time-lapse SPM images

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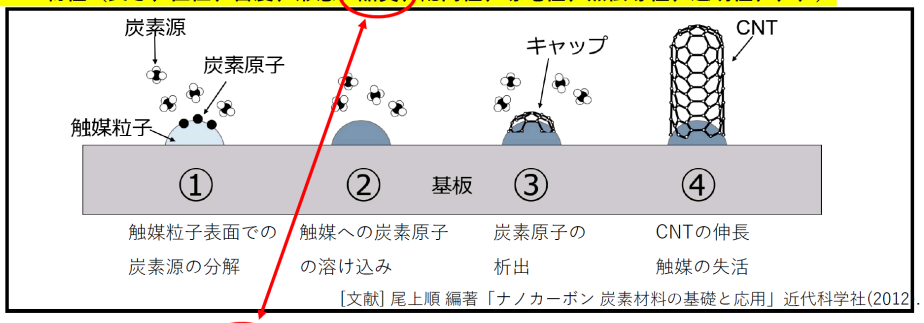
This paper presents methods for enhancing and restoring scanning probe microscopy (SPM) images. We focus on image super-resolution as enhancement and image denoising and deblurring as restoration. Assume that almost same time-lapse images are captured in the same area of each specimen. In contrast to a single image, our proposed methods using a recurrent neural network improve the enhancement and restoration of SPM images by merging the time-lapse images in order to acquire a single enhanced/restored image. However, subtle deformations between the time-lapse SPM images and degraded pixels such as noisy and blurred pixels in the SPM image disturb the network to successfully merge the images. For the successful merge, our methods spatially align the time-lapse images and detect degraded pixels based on the characteristic property of SPM images. Experimental results demonstrate that our methods can reconstruct sharp, super-resolved images, and clean noiseless images.

カーボンナノチューブ薄膜の成長制御（途中）

■ **CNTの物性（長さ、直径、密度、形態、品質、配向性、導電性、熱伝導性、透明性、、、）**

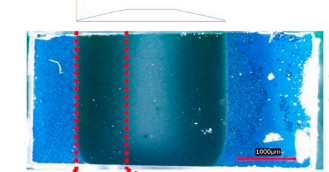


［文献］尾上順 編著「ナノカーボン 炭素材料の基礎と応用」近代科学社(2012).

■ **CNTの成長パラメータ（触媒量、成長温度、成長時間、基板の種類、炭素源（ガス種、圧力）、、、**

各成長パラメータが物性に影響するかを調べることは重要
所望のCNTを得るためにはどのような条件にすればよいか？

実験結果：光学顕微鏡・SEM観察（600°C合成）



- 基板中央部でCNTが垂直成長
- 矢印の点までCNTの成長量が増加する
さらに触媒量が増加すると成長量は減少