1. Title:	Analysis of relation between resist LER and optical condition of exposure tool in EUV lithography
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3. Abstract body:

It is recognized that the line edge roughness (LER) appeared in a replicated resist pattern is highly influenced by optical image. We have measured the LER of lines-and-spaces (L/S) patterns under the various condition of optical image by changing pattern width, defocus, illumination and resist. The exposure was performed by EUV microexposure tool HiNA (@ASET) and MET (@Berkeley).The results indicated that the LER directly relates to the aerial image contrast (aerial image was calculated by SOLID-EUV). On the other hand, there were experimental evidence that the value of LER obtained at one side of L/S pattern sometimes showed significant differences with that obtained from the other hand edge in a same pattern. The differences between those edges were sometimes double in 3 sigma, and which appeared mainly in rather big patterns. The calculated image showed that with the existence of some aberration in projection optics, or with an unsymmetrical illumination, aerial image of L/S pattern shows unsymmetrical edge slope. This indicates that also the image slope gives a considerable effect on LER, as usually assumed. We will discuss the relation of image contrast and image slope in LER and make a consideration for the types of aberration and illuminations which are responsible for LER. This work was supported by NEDO.