Fabrication of High Precision, Multilayer Based Polarimeter Designed for Wide Energy Range in EUV

H. Takenaka[1], N. Kuwabara[1], N. Kamachi[1], K. Endo[1], T. Ohchi[2], S. Ichimaru[2], H. Kimura[3], J. Laksman[4], F. Hennies[4] and R. Sankari[4]

[1]*Toyama Co., Ltd., 3816-1, Kishi, Yamakita, Kanagawa 258-0112, Japan*

[2]*NTT Advanced Technology Co., 3-1, Morinosato Wakamiya, Atsugi, Kanagawa, 243-0124, Japan*

[3]*JASRI/SPring-8, 1-1-1, Kouto, Sayo-cho, Sayo-gun, Hyogo, 679-5198, Japan*

[4]*MAX IV Laboratory, Lund University, SE-22100 Lund, Sweden*

** E-mail: takenaka@toyama-jp.com*

Abstracts: *We designed and fabricated a high precision five-axis polarimeter for wide energy range in EUV using transmission and reflection multilayers. This polarimeter is supported on a hexapod so that it can be transferred easily between different EUV beamlines.*

A polarimeter with multilayers has been used to characterize the state of polarization of the EUV beam such as synchrotron radiation, and the optical properties of the multilayers can be determined simultaneously [1-3]. A high precision five-axis EUV polarimeter using transmission multilayers as polarizers or phase shifters, and reflection multilayers as analyzers have been designed and fabricated (Fig.1). Using this instrument, a set of Mo/Si, Cr/C, Sc/Cr, W/B_4C multilayers for reflection and transmission (Fig.2) have also been developed. Reflection multilayers were fabricated using magnetron sputtering and transmission multilayers were fabricated using CVD deposition, magnetron sputtering and chemically etching process [4, 5]. A multilayer holder can store five sets of transmission and reflection multilayers [2], and the multilayers can be directly transferred from the holder, mounted and aligned in situ to the measuring position by wobble-stick mechanism. This polarimeter is supported on a hexapod to simplify the alignment [6]. The whole machine is designed to be transferred easily between different EUV beamlines at synchrotron facilities.

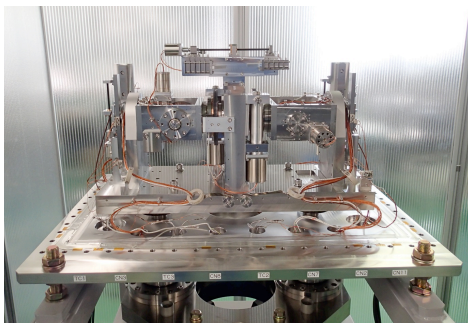

Fig. 1: *Fabricated polarimeter.*

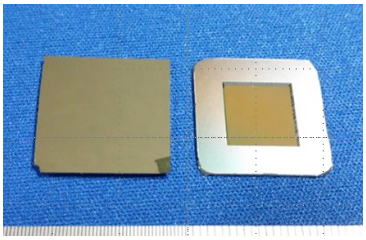

Fig. 2: *Example of transmission multilayers*

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