

Kiyotaka WASA (birth day 1937.02.24)

1) Education

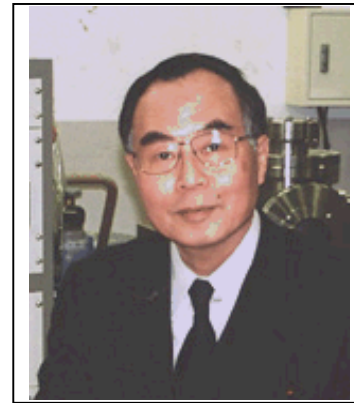
B.Sc.1960, Osaka University in electrical engineering,
Dr.Eng. 1968, Osaka University in plasma physics.

2) Present position/ address

Adjunct Prof. Yokohama City University
JST * Researcher, Kyoto University

*JST: Japanese Agency of Science and Technology

Address: Dept. of Micro-engineering, Kyoto University
Yoshida Honmachi, Sakyo-ku Kyoto
606-8501 Japan
TEL +81-75-753-5698
FAX +81-75-950-1060
e-mail: kiyotaka.wasa@kt2.ecs.kyoto-u.ac.jp



3) Professional experience

- 1960-1997, Research Staff, Matsushita Electric Ind. Co. Ltd.,
- 1990-1997, Deputy Director, Research Institute of Innovative Technology for the Earth (RITE)*,
- 1997-2003, Professor, Faculty of Science, Yokohama City University.
- 2003-present Adjunct Professor, Yokohama City University
- 2003-present JST Scientific Adviser
- 2005-present JST Researcher , Kyoto University
- 2004-present Editor of Vacuum (Elsevier)

(Miscellaneous)

- 1985-1989, Visiting Professor, Osaka University,
- 1995-1997, Visiting Professor, Kanazawa University.
- 1996-present, Adjunct Professor, K-JIST (Kwangju, Korea).
- 1996-present Honorary Professor, UESTC(Chengdu, China).
- present Honorary Professor, Nanjing University

*RITE: Japanese government Institute settled in 1989 for a fundamental research on the global environmental technology especially aimed at Global Warming Issues. Head office and institute are at Kizugawadai, Kyoto.

4) Research Fields:

He has done seminal work on plasma-based thin film materials engineering from academic to industrial production since 1960's. He has proposed the usefulness of cathodic sputtering for a synthesis of novel materials since 1960's. He first proposed the planar magnetron sputtering system (1969) which is now widely used in a production of semiconducting devices. He applied to produce a wide variety of electronics/photonics thin film materials including perovskite ferroelectric materials (since 1967), SAW device grade piezoelectric ZnO (1972), diamonds (1976), SiC high temperature thermistors (1979), and high-Tc superconductors (1987). It is noted he first succeeded to synthesized diamond crystallites at room temperature (1984) and atomically controlled layered high Tc superconductors (1988) during his stay at Panasonic.

He has also proposed plasma-based thin film materials processing as an environment benign industrial technology (1982). He studied on atomically controlled deposition of thin film materials including single crystal perovskite for the environment catalysis at RITE Institute and Yokohama City University.

He is also interesting to education of young generation. He is visiting oversea countries to educate young generation and/or make exchange program of young students between Japan and Asian country. He also gave a series of lecture on thin film materials science at Penn. State University (since 1993), at UESTC China (since 1986) and K-JIST Korea (since 1996).

He has produced thin film devices including ZnO SAW devices, SiC thin film temperature sensors, and high density magnetic heads at Panasonic(1981).

These academic researches and educational activity are still continued at Kyoto University, although he is now over 70 years old.

5) Professional Organization:

IEEE (Life Fellow), Materials Research Society of India (Fellow),
American Vacuum Society, Materials Research Society of America, American Ceramic Society,
The Applied Physical Society of Japan, The Surface Science Society of Japan, The Ceramics Society of Japan,
The Vacuum Society of Japan (Advisory committee), The Laser Society of Japan.
Editor of Vacuum (Elsevier)

6) Courses Taught:

Yokohama City University:

Undergraduate: Introduction to Physics, Vibrations and Waves, Global Environment Issues

Graduate: Materials Synthesis, Plasma-based Materials Science.

Pennsylvania State University (USA), KJIST (Korea)

Graduate: Thin Film Material Technology (Series lectures)

7) Awards□

1) Science and technology agency of Japan: Distinguished invention on “ Hydrogen storage system” (1977).

2) Science and technology agency of Japan: Distinguished research on “Thin film materials research by sputtering process” (1986).

3) IEEE Fellow USA: Distinguished research on “Thin film materials research and application by sputtering”, (1990).

8) Publications:

Scientific Journals: more than 300 papers: Books: more than 10 books: Patents: more than 700 patents.

Selected Publications:

(Journals)

- 1) **K.Wasa** and S.Hayakawa: Low pressure sputtering system of magnetron, Rev.Sci.Instr., 40(1969)693.
- 2) **K.Wasa** and S.Hayakawa: Special features of Thin Compounds films prepared by magnetron sputtering, Surface Sci.,86(1979)760.
- 3) Yamazaki O., **Wasa K.**, and Hayakawa S., "ZnO Thin Film Saw Devices", IEEE Trans, SU-27(1980)369.
- 4) **Wasa K.**, Yamazaki O., Adachi H., Setsune K., and Kawaguchi T., "Optical TIR Switches using PLZT Thin Film", IEEE j. Lightwave Technol.,LT-2 (1984)740.
- 5) Kitabatake M. and **Wasa K.**, "Growth of diamond at room temperature", J. Appl. Phys.58 (1985)1693.
- 6) **Wasa K.**, "Basic deposition process and ferroelectric properties of sputtered PLZT thin films", Ferroelectrics 151(1992)343.
- 7) H.Adachi and **K.Wasa**: Superconductivity in LSC single crystal films, Phys.Rev.B,35 (1987) 8824.
- 8) **K.Wasa**: Materials engineering for a better global environment, Bull. Mater.Soc.India, 18(1995)937.

(Books)

- 9) **K.Wasa** and S.Hayakawa: Handbook of sputter deposition technology, Noyes Publications N J, USA (1991).
- 10) **K.Wasa**, H. Adachi, and M. Kitabatake: Thin Film Materials Technology, Springer, William Andrew Pub., NY, USA (2004).

Recent Publications

- 1). Zhang T., **Wasa, K.**, Kanno I., and Zhang S-Y., "Ferroelectric properties of Pb(Mn_{1/3}Nb_{2/3})O₃ -Pb(Zr,Ti)O₃ thin films epitaxially grown on (001)MgO substrates", J. Vac. Sci. Technol. A26(4), Jul/Aug 2008, p985-990.
- 2). **K.Wasa**, I. Kanno, Kotera H., Yamauchi N., and Matsushima T., "High coupling piezoelectric thin films of Pb(Zr,Ti)O₃-based ternary perovskite compounds for GHz FBAR", Proc. of 2008 IEEE US symposium (Beijing Nov.2008)paper 6B-5.
- 3). **Wasa K**, Mino T., Kanno I., and Kotera H., "Ferroelectric Properties of Ternary Perovskite Compounds of Modified PZT Thin Films Epitaxially grown on (001)MgO", Proc. of 13th US-Japan Seminar on Dielectric and Piezoelectric Ceramics, Nov. 2007 Awaji, Japan
- 4). **Wasa K**, Kanno I., Mino T., Kuwajima S., Suzuki T., and Kotera H., "Basic Deposition Process and Ferroelectric Properties of Stress Free Pb- based Ferroelectric Thin Films of Perovskite Structure", Proc. of Third International Symposium on Acoustic Wave Devices for Future Mobile Communication Systems,IEEE, March 2007 Chiba, Japan , p.125.
- 5). **Wasa K.** Nakamura K., Matsunaga I., Kanno I., Suzuki T., Okino H., Yamamoto T., Seo S.H., and Noh D.Y., "Electromechanical coupling factors of single domain 0.67PMN-0.33PT single crystal thin films", Appl. Phys. Lett., vol.88, p.122903-1-122903-3 (2006).
- 6). **Wasa K.**,Kanno I., and Suzuki T., "Structure and Electromechanical properties of quenched PMN-PT single Crystal Thin Films", Advances in Science and Technology, vol.45, pp1212-1217(2006)
- 7).Ichikawa Y., Matsunaga T., Hassan M., Kanno I., Suzuki T., and **Wasa K.**, " Growth and structure of heteroepitaxial lead titanate thin films constrained by miscut strontium titanate substrates", J. Mater. Res ., vol.21, p.1261-1268 (2006).
- 8).Suzuki T., Kanno I., Loverich J.J., Kotera H., and **Wasa K.**, "Characterization of Pb(Zr,Ti)O₃ thin films deposited on stainless steel substrates by RF-magnetron sputtering for MEMS applications", Sensors and Actuators, A 125, p.382-386 (2006).
- 9). **Wasa K.**,Kanno I.,and Suzuki T., "Preparation and Admittance Properties of PMN-PT Thin Films", Piezoelectric Materials and Devices Symposium, Proc., p.23-28(2006).
- 10). Seo S.H., Kang H.C., Noh D.Y., Yamada Y., and **Wasa K.**, "Antiphase-type planar defects in Pb(Mg_{1/3}Nb_{2/3})O₃/SrTiO₃ thin films", Appl. Phys. Lett., 84(2004)3133.