

## HORIBA Products for Semiconductor Manufacturing Process

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HORIBA has put many products out into the world as a manufacturer specialized in analyzers since the establishment of HORIBA, Ltd., in 1953. Since then, based on a wide variety of analysis measurement technologies we have cultivated, we have developed products, giving the first priority to meeting customer needs and applications and offering optimum products in each field. Currently, we are developing business with a focus on our analysis measurement technologies in the following five business fields: Automotive measurement, Environment and process, Science, Medical purpose, and Semiconductor (Figure 1).

Our analysis measurement technologies are not only used in particular fields but also can be utilized in other fields by adding a little twist to the applications. Our engine exhaust gas measuring device, which is currently our main product and has 80% of world market share<sup>\*1</sup>, was originally created by developing the application of an expired gas measuring device in the years from 1960 to 1965 when atmospheric air pollution due to vehicle emissions was becoming an issue. In this way, HORIBA has been good at applying products and technologies developed from the needs of each field to other fields.

HORIBA STEC Co., Ltd., developing its business mainly in the semi-



Figure 1 Five business segments of HORIBA Group

conductor business field, has more than 50% of world market share<sup>\*2</sup> in Mass Flow Controllers incorporated in semiconductor manufacturing devices (Figure 2). Among the products other than Mass Flow Controllers, there are also many product lines in which the technologies cultivated in HORIBA's other business fields are utilized. For example, we offer gas monitor IR series products (Figure 3) using NDIR technology (non-dispersive infrared resonance method), which is applied to engine exhaust gas measuring devices in the automotive measurement field as well as stack gas analyzers in the environment and process field. These gas monitors measure the concentration of gas components supplied while manufacturing semiconductors and are used in controlling film thickness during film formation as well as used as an end point monitor when measuring the concentration of a particular gas on the exhaust side and cleaning the inner wall of reaction chamber. It can be said that these products are a typical example of utilizing analysis measurement technologies originally developed for products in other business fields to applications in the semiconductor field.

Nowadays, with a steady increase in the IoT (Internet of things), the possibility of the rapid expansion of semiconductor-related market is discussed a lot. It is said that a wide variety of sensors using semiconductors will be increasingly required and the demand for semiconductors for data storage and communication will increase (Figure 4). In addition, since image recognition and AI technologies are required to realize automated car driving technology, the demand for semiconductors is expected to increase year by year not only in the field of communication devices, such as PCs and smartphones, but also in other fields.

With the increase in the demand for semiconductors as described above, we expect that customer needs will be more difficult and diversified as their semiconductor manufacturing processes will be further miniaturized and highly integrated. In order to respond to such needs in a timely fashion, HORIBA will make the maximum use of a wide variety of our analysis measurement technologies and fluid control technologies.

HORIBA will continue to contribute to semiconductor processes in the measurement, control, and analysis fields by responding to various applications using the technologies owned by the HORIBA Group.

\*1: According to the research conducted by Horiba (2015)

\*2: According to the research conducted by Horiba (as of March 2016)



Figure 2 Gas (red) and liquid (blue) mass flow controller/meter



Figure 3 IR series

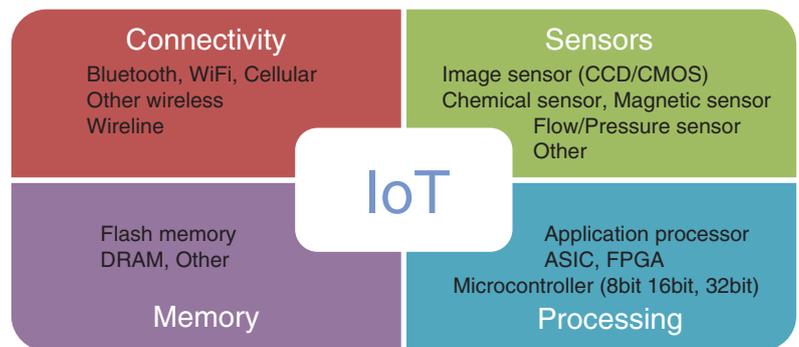


Figure 4 Semiconductor opportunities from IoT



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