ABSTRACT

EXPOSURE APPARATUS, EXPOSURE METHOD, AND
DEVICE PRODUCING METHOD

An exposure apparatus EX has a projection optical system PL. The projection optical system PL has a first optical element LS1 closest to an image plane thereof and a second optical element LS2 which is second closest to the image plane with respect to the first optical element LS1. The first optical element LS1 has a lower surface T1 arranged opposite to a surface of a substrate P and an upper surface T2 arranged opposite to the second optical element LS2. A space between the second optical element LS2 and the upper surface T2 of the first optical element LS1 is filled with a second liquid LQ2 so that a liquid immersion area is formed in an area of the upper surface T2, the area including an area AR' through which an exposure light beam EL passes. The substrate P is exposed by radiating the exposure light beam EL onto the substrate P through a first liquid LQ1 on a side of the lower surface T1 of the first optical element LS1 and the second liquid LQ2 on a side of the upper surface T2. It is possible to avoid any deterioration of the exposure accuracy caused by the pollution of the optical element, and to suppress any enormous expansion of the liquid immersion area.

[Figure 5a and 5b]