A Quantum dynamic approach to the condensation processes of zinc atoms by the inner - core excitation due to ion - recombination

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Abstrak

Isolated atoms in group II-B such as zinc (Zn),
cadmium (Cd), and mercury (Hg) are chemically
stable. These atoms are important in the formation of excimer. Zinc in particular has been
investigated by many researchers, as Zn2
excimer holds promise because of its long lifetime and
its potential as an energy-storage system. However, excimer?s benefits are based on excitation
of the outermost electron. Our study confirmed the quantum
dynamical condensation processes
in which inner-core excitation arises due to ion-recombination between the vapor phase and the
solid phase. The X-ray diffraction of the condensed
structure of zinc film had included strong
diffuse scattering depending on the
incident energies. In this research, we produced the excited
state of zinc excimer characterized by an extremely long lifetime.
Intriguingly, a feature of the
zinc film is that it transforms
from metallic to insulative. It is thought that
such a structure with
this characteristic has been affected by electron spin and atomic distortion by inner-core
excitation. The structure obtained in our experiment is expected to prove promising in
engineering applications, such as electronics, spintroni
cs, and batteries.