FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS

Project Title: Single atom identification using scanning magnetic resonance microscopy	
Name: Yoshiaki SUGIMOTO	**Institution**: Osaka university

1. Background of research

Chemical identification of individual surface atoms is an important technique in various fields, such as identification of products by catalytic reaction and dopant identification in semiconductor. Some methods for single atom identification have been proposed, which are based on molecular vibration or measurement of chemical bonding force. Nevertheless, development of chemical identification that can be applied to any single atoms is still challenging.

2. Research objectives

The purpose in this study is development of an atomically-resolved scanning probe microscopy combined with nuclear magnetic resonance technique, using which chemical identification based on detection of single nuclear magnetic moment is established.

3. Research characteristics (incl. originality and creativity)

The proposed study is very challenging since the microscopy has not only atomic resolution but also chemical sensitivity, which has never been achieved before.

4. Anticipated effects and future applications of research

The propose method can be applied to chemical identification at room temperature and even in air and liquid. Actually, basic research for nuclear magnetic resonance in cryogenic temperature has led to magnetic resonance imaging technique. If the versatile instrument for chemical identification is developed in future, this is quite useful for various purpose and contributes to solving many social problems that we have.