



## Dr. Yining Huang

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University of Western Ontario

Wednesday, January 25th 2023

11:00 a.m. to 11:50 a.m. in ENW 115

### Characterization of Metal-organic Framework: what we can learn from solid-state NMR spectroscopy

#### ABSTRACT

An exciting advance in materials science is the development of hybrid organic-inorganic solids known as metal-organic frameworks (MOFs). MOFs have unique properties such as modularity, tunable pore sizes/functionality, high surface areas and permanent porosity. Although MOFs have numerous important applications such as gas storage/adsorption, sensing, catalysis, drug delivery etc., the local structures, specific molecular-level features, and guest behaviours underpinning desirable properties and applications are often not well understood. Solid-state NMR spectroscopy (SSNMR) is a powerful technique for MOF characterization.

In this presentation, I will talk about our recent work on MOF characterization by using state-of-the-art NMR probe and magnet technologies to obtain ultrahigh resolution  $^{17}\text{O}$  and  $^{67}\text{Zn}$  MAS spectra; interrogating  $^{91}\text{Zr}$ ,  $^{71/69}\text{Ga}$ ,  $^{65/63}\text{Cu}$  in MOFs via their wide-line SSNMR spectra; monitoring the behavior of gas molecules adsorbed in MOFs. SSNMR results allow us to gain a deeper understanding of the structure-properties-function relationships in MOF systems. Furthermore, we have recently made strides in designing novel protocols for post-synthetic modification of MOFs. Solid-state NMR played a key role in establishing these new platforms.

#### BIOGRAPHY

##### Yining Huang

Dr. Yining Huang obtained his B.Sc and M.Sc from Peking University and earned his Ph.D. from McGill University. After an NSERC post-doctoral fellowship at the University of British Columbia, he started his independent academic career at Laurentian University as an Assistant Professor. He is currently full Professor in the Department of Chemistry, The University of Western Ontario. Dr. Huang has published more than 240 peer-reviewed papers. He has won several awards and the examples include Canada Research Chair; Premier's Research Excellence Award; Florence Bucke Award. Dr. Huang was the Chair of the Department of Chemistry at Western from 2014-2022. He is the co-editor-in-chief of the *Canadian Journal of Chemistry*. His current research interest focuses on characterization of inorganic materials (including layered materials, zeolites and related molecular sieves, mesoporous materials and metal-organic frameworks) by solid-state NMR and vibrational spectroscopy.