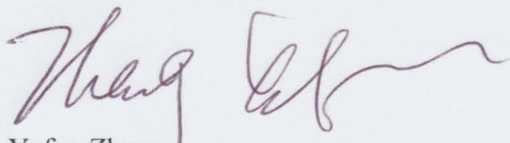


## Copyright Release

I, Yafen Zhang, as the author of the dissertation, grant Virginia Tech the right to display or copy part or all of the dissertation, in all forms of media, for use within Virginia Tech, and to make available the dissertation to other persons or organizations being either educational or industrial, for reference purposes or for other legitimate educational purposes.



Yafen Zhang

Department of Chemistry, Virginia Tech

August 27, 2015