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## Exploring coordination chemistry and reactivity of formazanate ligands

Travieso Puente, Raquel

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**Exploring coordination chemistry and  
reactivity of formazanate ligands**

**Raquel Travieso Puente**

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university of  
 groningen

# **Exploring coordination chemistry and reactivity of formazanate ligands**

**PhD thesis**

to obtain the degree of PhD at the  
 University of Groningen  
 on the authority of the  
 Rector Magnificus Prof. E. Sterken  
 and in accordance with  
 the decision by the College of Deans.

This thesis will be defended in public on

Friday 13 October 2017 at 11:00 hours

by

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born on 9 October 1987  
 in Ponferrada, Spain

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**Assessment committee**

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Prof. W. R. Browne

Prof. H.-J. Krüger

*Esta tesis va dedicada a mi guía y mi ejemplo de vida.*

*A la sonrisa infinita, luchadora insaciable.*

*Esta tesis va dedicada a ti, Mamá.*

*Queda prohibido llorar sin aprender,  
levantarte un día sin saber qué hacer,  
tener miedo a tus recuerdos.*

*Queda prohibido no sonreír a los problemas,  
no luchar por lo que quieres,  
abandonarlo todo por miedo,  
no convertir en realidad tus sueños.  
[...]*

*Queda prohibido no intentar comprender a las personas,  
pensar que sus vidas valen más que la tuya,  
no saber que cada uno tiene su camino y su dicha.*

*Queda prohibido no crear tu historia,  
no tener un momento para la gente que te necesita,  
no comprender que lo que la vida te da también te lo quita.  
[...]*

*Queda prohibido no buscar tu felicidad,  
no vivir tu vida con una actitud positiva,  
no pensar en que podemos ser mejores,  
no sentir que sin ti, este mundo no sería igual.*

~~~~~

*It is forbidden to cry without learning,  
to wake up one day not knowing what to do,  
to be afraid of your memories.*

*It is forbidden not to smile at problems,  
not to fight for what you want,  
to abandon everything because of fear,  
not to transform your dreams into reality.  
[...]*

*It is forbidden not to try to understand people,  
to think that their lives are more valuable than yours,  
not to know that each person has his own ways and his own joy.*

*It is forbidden not to create your history,  
not to have a moment for the people who need you,  
not to understand that whatever life gives you, it takes it away as well.  
[...]*

*It is forbidden not to search for your happiness,  
not to live your life with a positive attitude,  
not to think that we can be better,  
not to feel that, without you, this world wouldn't be the same.*

**~ Pablo Neruda ~**

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# List of compounds

◆ Formazan ligands previously reported<sup>1</sup>:

**1-H:** PhNHNC(*p*-tol)NNPh

**2-H:** MesNHNC(CN)NNMes

**3-H:** PhNHNC(<sup>t</sup>Bu)NNPh

**4-H:** MesNHNC(*p*-tol)NNPh

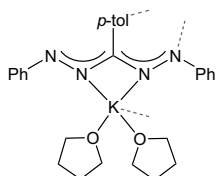
**5-H:** MesNHNC(*p*-tol)NNMes

**6-H:** C<sub>6</sub>F<sub>5</sub>NHNC(*p*-tol)NNMes

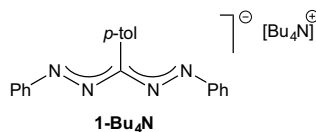
**8-H:** PhNHNC(C<sub>6</sub>F<sub>5</sub>)NNMes

**9-H:** C<sub>6</sub>F<sub>5</sub>NHNC(C<sub>6</sub>F<sub>5</sub>)NNMes

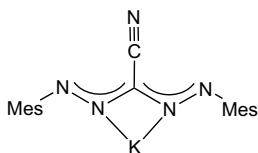
◆ Compounds presented in Chapter 2:



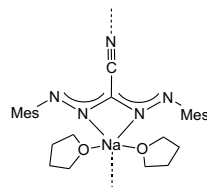
**1-K (dimer):** K[PhNNC(*p*-tol)NNPh]·2THF



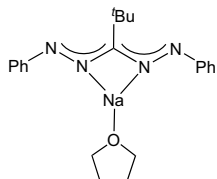
**1-Bu<sub>4</sub>N:** [Bu<sub>4</sub>N][PhNNC(*p*-tol)NNPh]



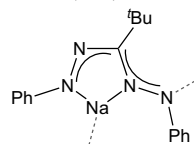
**2-K:** K[MesNNC(CN)NNMes]



**2-Na (polymer):** Na[MesNNC(CN)NNMes]·2THF

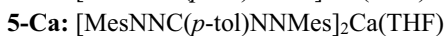
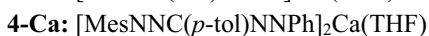
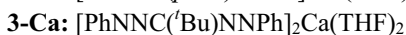
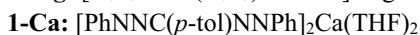
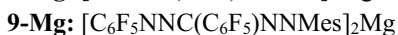
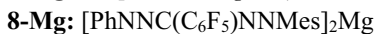
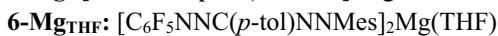
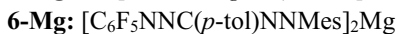
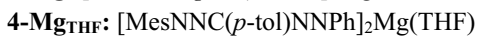
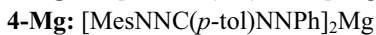
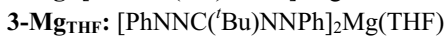
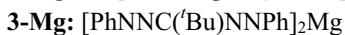
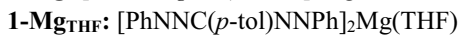
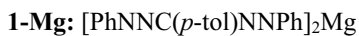


**3-Na<sub>THF</sub>:** Na[PhNNC(<sup>t</sup>Bu)NNPh]·THF

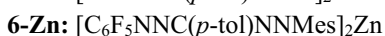
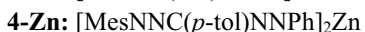
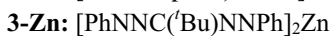
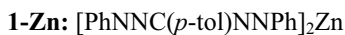


**3-Na (hexamer):** Na[PhNNC(<sup>t</sup>Bu)NNPh]

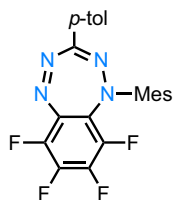
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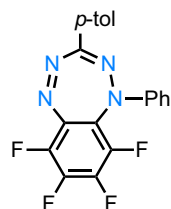
Other compounds reported previously used for comparison<sup>1</sup>:



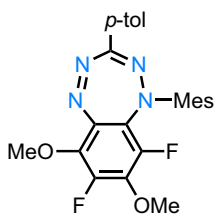
◆ Compounds presented in Chapter 4 and 5



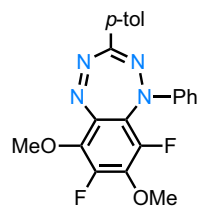
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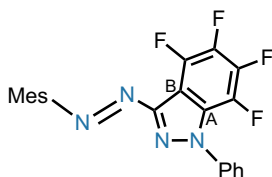
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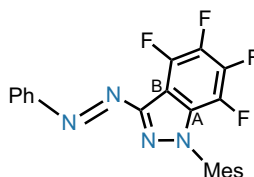
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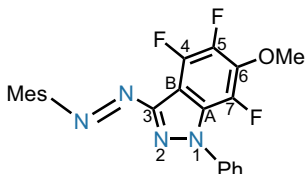
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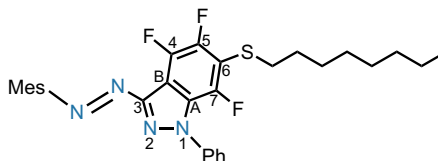
**Azoindazole 4.3**



**Azoindazole 4.4**

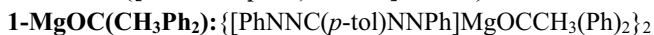
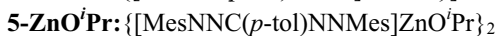
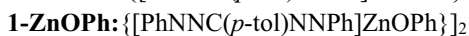
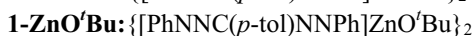
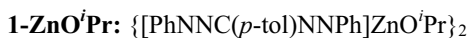


**Azoindazole 4.3<sup>OMe</sup>**

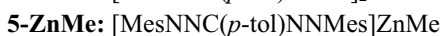
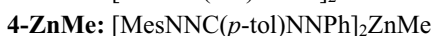
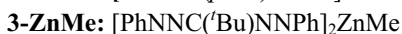
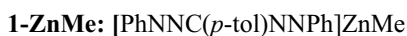


**Azoindazole 4.3<sup>SC8H17</sup>**

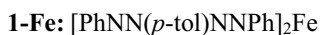
◆ Compounds presented in Chapter 6:



Other compounds reported previously<sup>1</sup>:



◆ Compounds presented in Chapter 7:



(1) Chang, M.-C. *Thesis: Formazanate as a Redox-Active, Structurally Versatile Ligand Platform*; 2016.



