**ReadMe File for the data accompanying the work “Dynamic Covalent Urea-Catalysed Self-Healing of Thiol-Maleimide Networks”, which is included as Chapter 4 in the Thesis “Applications of Dynamic Covalent Chemistry in Chemical Reaction Networks” by Benjamin Spitzbarth**

Below follows a list to explain the codes used in all files. All kinetic NMR experiments were measured in dimethyl carbonate with a glass insert containing D2O (lock signal) and an internal standard for referencing.

BS 185: characterisation of the Diels-Alder adduct of furan and maleic anhydride (Proton NMR spectrum)

BS 189: characterisation of the product of the reaction from BS 185 and 3-amino-1,2-diol (Proton NMR spectra)

BS 236: characterisation of maleimide-diol (Proton and COSY NMR spectra)

BS 241: characterisation of DIPU (Proton, Carbon, HSQC, and HMBC NMR spectra)

BS 244: T1 measurement for thiol-maleimide adduct **3** and *N*-methyl maleimide **1**

BS 272: characterisation of thiol maleimide adduct **3** (Proton, Carbon, HMBC, HSQC NMR spectra)

LS 041: characterisation of thiol maleimide adduct **4** (Proton, Cosy, Carbon, HMBC, HSQC, Fluorine NMR spectra)

BS 245 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from *N*-methyl maleimide **1** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of TBEU (12.5 mM) in dimethyl carbonate at 25 °C.

BS 247 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from *N*-methyl maleimide **1** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of TBIPU (12.5 mM) in dimethyl carbonate at 25 °C.

BS 248 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from *N*-methyl maleimide **1** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of DIPU (12.5 mM) in dimethyl carbonate at 25 °C.

BS 253: NMR tracking of the reaction from benzyl isocyanate and ethyl-3-mercaptopropionate **2** (25 mM each), with the addition of 50mol% triethylamine after ~ 12 hours, in dimethyl carbonate.

BS 256 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from *N*-methyl maleimide **1** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of TBEA (12.5 mM) in dimethyl carbonate at 25 °C.

BS 258 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from *N*-methyl maleimide **1** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) without catalyst in dimethyl carbonate at 25 °C.

BS 260 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from *N*-methyl maleimide **1** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of TBIPA (12.5 mM) in dimethyl carbonate at 25 °C.

BS 261 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from *N*-methyl maleimide **1** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of DIPA (12.5 mM) in dimethyl carbonate at 25 °C.

BS 262 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from *N*-methyl maleimide **1** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of TBEU (12.5 mM) in dimethyl carbonate at 45 °C.

BS 263 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from *N*-methyl maleimide **1** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of DIPU (12.5 mM) in dimethyl carbonate at 45 °C.

BS 268 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from *N*-methyl maleimide **1** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in dimethyl carbonate at 45 °C.

LS 0161 & 0162: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from *N*-methyl maleimide **1** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of DIPA (12.5 mM) in dimethyl carbonate at 45 °C.

LS 0154 & 0155: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from *N*-methyl maleimide **1** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of TBEA (12.5 mM) in dimethyl carbonate at 45 °C.

LS 17 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from thiol maleimide adduct **4** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of TBEU (12.5 mM) in 3/1 dimethyl carbonate/DMSO at 25 °C.

LS 12 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from thiol maleimide adduct **4** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of TBEA (12.5 mM) in 3/1 dimethyl carbonate/DMSO at 25 °C.

LS 09 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from thiol maleimide adduct **4** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of DIPU (12.5 mM) in 3/1 dimethyl carbonate/DMSO at 25 °C.

LS 14 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from thiol maleimide adduct **4** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of DIPA (12.5 mM) in 3/1 dimethyl carbonate/DMSO at 25 °C.

LS 15 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from thiol maleimide adduct **4** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) without catalyst in 3/1 dimethyl carbonate/DMSO at 25 °C.

LS 26 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from thiol maleimide adduct **4** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of TBEU (12.5 mM) in 3/1 dimethyl carbonate/DMSO at 45 °C.

LS 27 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from thiol maleimide adduct **4** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of TBEA (12.5 mM) in 3/1 dimethyl carbonate/DMSO at 45 °C.

LS 31 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from thiol maleimide adduct **4** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of DIPU (12.5 mM) in 3/1 dimethyl carbonate/DMSO at 45 °C.

LS 29 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from thiol maleimide adduct **4** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) in the presence of DIPA (12.5 mM) in 3/1 dimethyl carbonate/DMSO at 45 °C.

LS 30 A & B: NMR kinetics experiments in duplicate to track formation of thiol maleimide adduct **3** from thiol maleimide adduct **4** (25 mM) and ethyl-3-mercaptopropionate **2** (25 mM) without catalyst in 3/1 dimethyl carbonate/DMSO at 45 °C.

BS 277 A: Rheology experiment of the synergistic dual self-healing polymer.

MA 15: Rheology experiment of the reference polymer with and without additional base.