SUPPORTING INFORMATION:

Maleimide-functionalized Poly(2-ethyl-2-oxazoline): Synthesis and Reactivity

Felix Wendler,[a,b] Tobias Rudolph,[a,b] , Helmar Görls,[c] Nils Jasinski,[d,e] Vanessa Trouillet,[f]

*Christopher Barner-Kowollik,[d,e] Felix H. Schacher[a,b]**

[a] Institute of Organic and Macromolecular Chemistry (IOMC), Friedrich Schiller University, Jena, Humboldtstr. 10, 07743 Jena, Germany

E-Mail: felix.schacher@uni-jena.de

[b] Jena Center for Soft Matter (JCSM), Friedrich Schiller University Jena, Philosophenweg 7, 07743 Jena, Germany

[c] Institute for Inorganic and Analytical Chemistry (IAAC), Friedrich Schiller University Jena, Humboldtstrasse 8, D-07743 Jena, Germany

[d] Preparative Macromolecular Chemistry, Institut for Technical Chemistry and Polymer Chemistry, Karlsruhe Institute of Technology (KIT), Engesserstrasse 18, 76128 Karlsruhe, Germany

[e] Institute für Biologische Grenzflächen, Karlsruhe Institute of Technology (KIT), Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen, Germany

[f] Institute für Angewandte Materialien (IAM) and Karlsruhe Nano Micro Facility (KNMF), Karlsruhe Institute of Technology (KIT), Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen, Germany

Crystallographic data deposited at the Cambridge Crystallographic Data Centre under CCDC-1434099 for **maleimide** contains the supplementary crystallographic data excluding structure factors; this data can be obtained free of charge via www.ccdc.cam.ac.uk/conts/retrieving.html (or from the Cambridge Crystallographic Data Centre, 12, Union Road, Cambridge CB2 1EZ, UK; fax: (+44) 1223-336-033; or deposit@ccdc.cam.ac.uk).

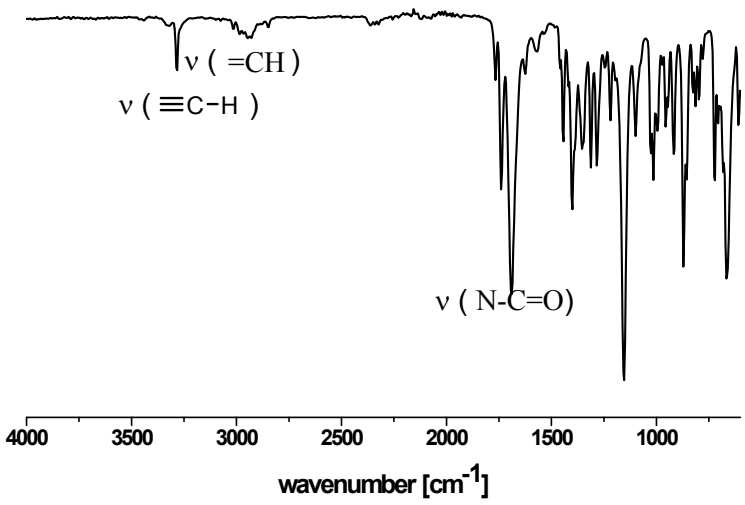

Figure S1: Characterization of the alkyne-functionalized maleimide *via* FT-IR.

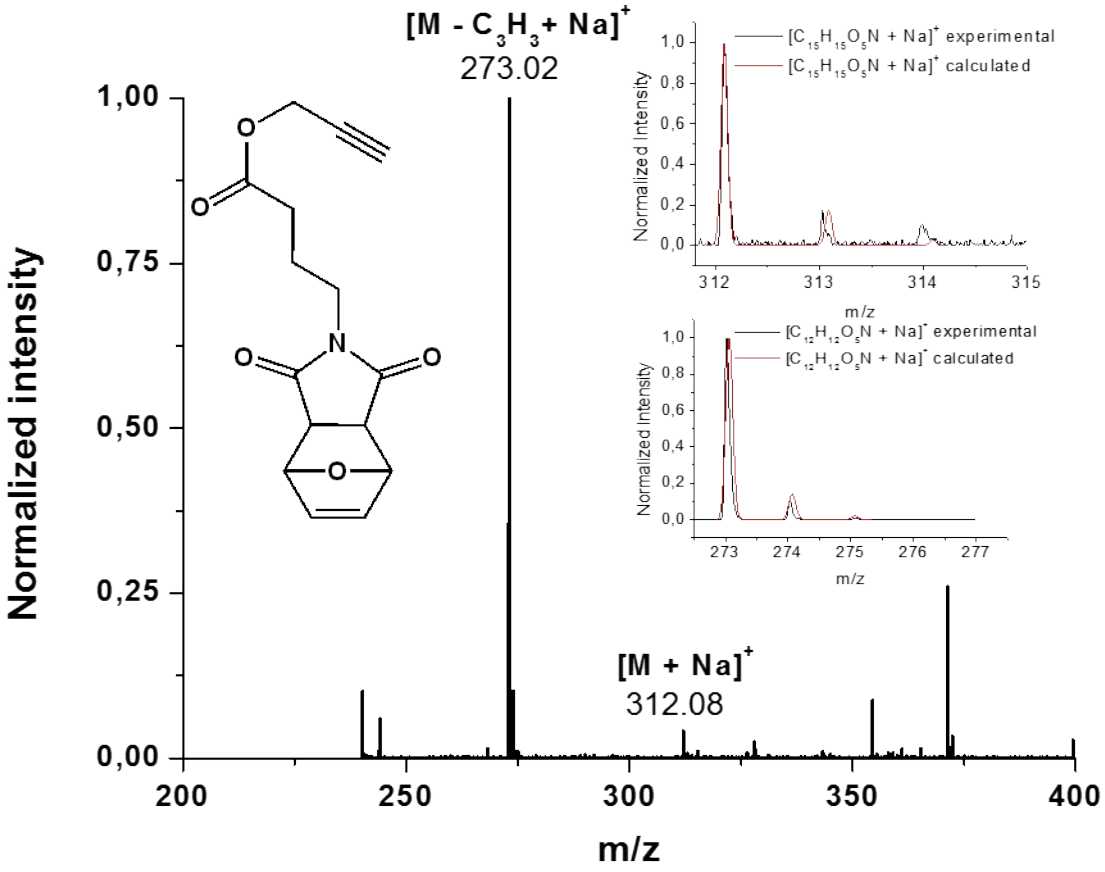

Figure S2: MALDI-ToF mass spectrum (DHB) of the alkyne-functionalized maleimide.

Table S1: Peak assignments of the MALDI spectrum of the alkyne-functionalized maleimide from *m/z* = 240 to *m/z* = 400.

Label	*m/z* theo	*m/z* exp	Δ *m/z*
$[M + Na]^+$	273.06	273.02	0.04
$[M - C_3H_3 + Na]^+$	312.08	312.09	0.01

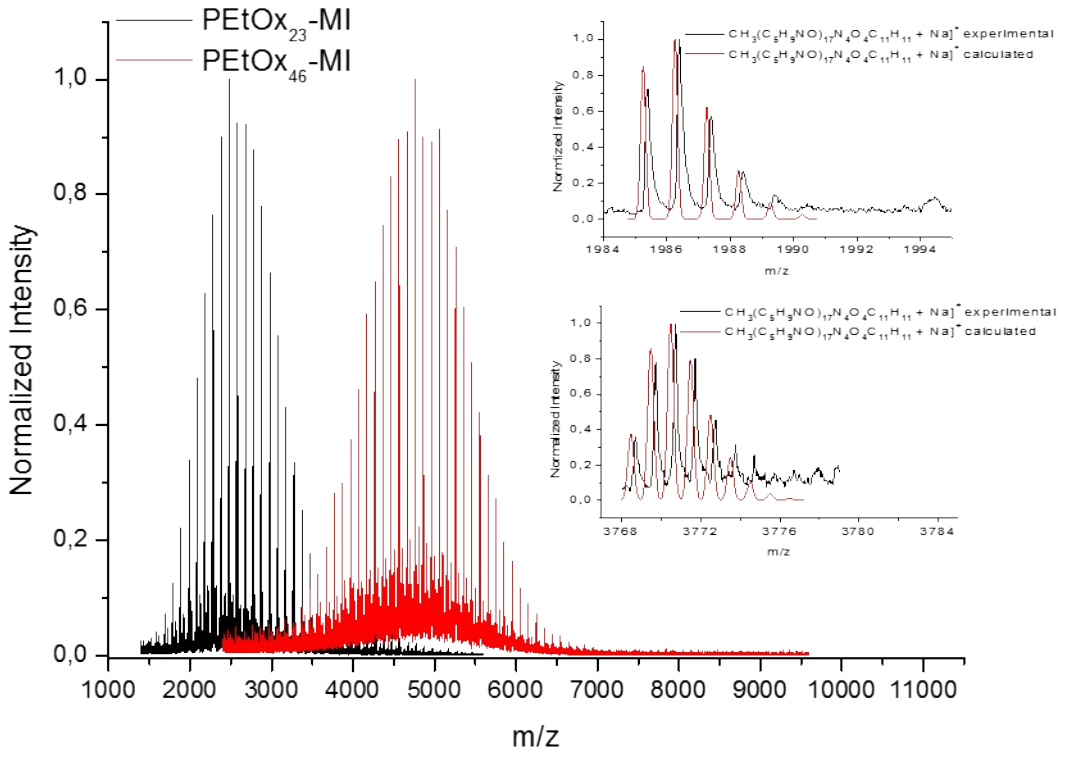

Figure S3: MALDI-ToF mass spectrum (Matrix: DCTB, salt: NaCl) for $PEtOx_{23}$-MI (black curve) and $PEtOx_{46}$-MI (red curve); insets: top magnification for the $PEtOx_{23}$-MI and bottom magnification for $PEtOx_{46}$-MI of the experimental and calculated spectra (black and red curve respectively).

In comparison to SEC and NMR, mass spectrometry is employed as a characterization tool to identify the polymer chain structure. The determination of the exact mass is a critical stage for an depth characterization of the synthesized macromolecules, *i.e.* for post-modification reactions especially for endgroup identification. In this case MALDI has been the chosen method to identify the molecular structure, the molar mass as well as the dispersity of the PEtOx-MIs. DCTB was used a aprotic, nonpolar matrix, which has a the ability of analyzing a wide variety of species at a low laser fluence. Furthermore, PEtOx-MIs were analyzed under reflector mode, having an experimental setup with a resolution of 0.1 amu, allowing the observation of isotopic patterns. (Figure S. 3, Table S. 2) A slight tailing of peaks were observed during the measurement leading to an error, which might be provoked by the dried droplet technique. Nonetheless, it remains within the resolving power (5000) of the reflector mode to provide endgroups. The molar masses are in

good agreement with the expected ones however, the end groups assigned portray the reduction of furan rings with sodium as counter ion. This incoherence might be due to the vacuum of the MALDI during the ionization/desorption process.

Table S2: Peak assignments of the MALDI spectrum of $PEtOx_{23}$-MI and $PEtOx_{46}$-MI.

	Label	*m/z* theo	*m/z* exp	Δ *m/z*
$PEtOx_{23}$-MI	$[M + Na]^+$	1985.25	1985.40	0.25
$PEtOx_{46}$-MI	$[M + Na]^+$	3768.49	3768.73	0.24

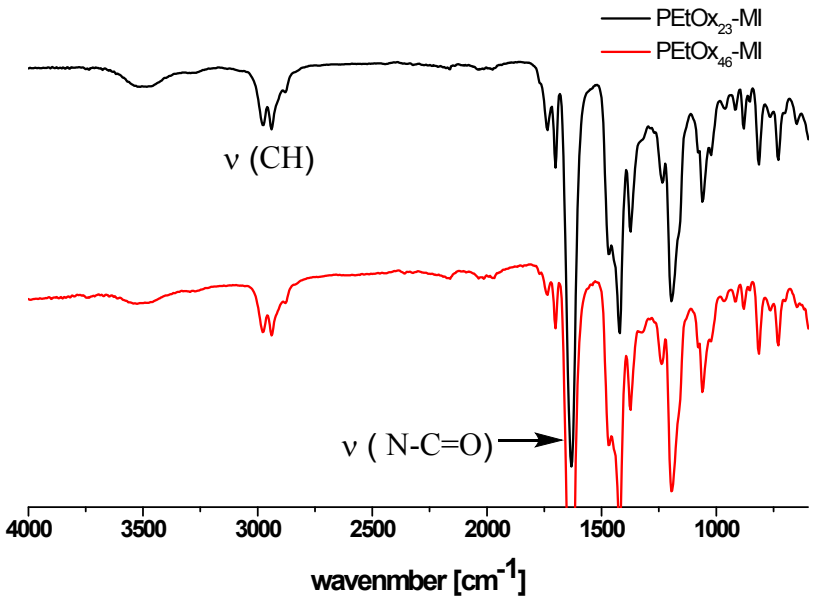

Figure S4: Overlay of IR spectra of $PEtOx_{23}$-MI (black trace) and $PEtOx_{46}$-MI (red trace).

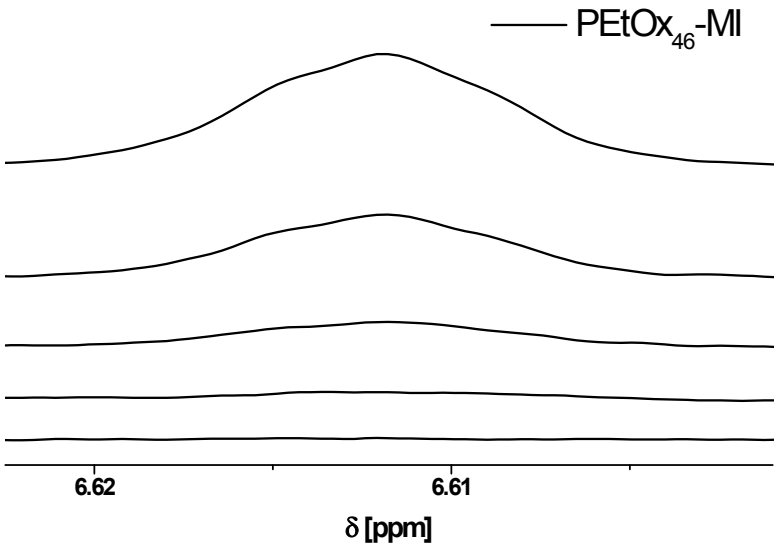

Figure S5 ^{1}H-NMR spectra (300 MHz, DMF-d_6) at different reaction times for PEtOx$_{46}$-MI (black traces).

Table S3: Orbitals, binding energies and calculated atom percent (at.%) of Sur 1 and Sur 2 measured by XPS.

orbital	Binding energy (eV)	at.% Sur 1	at.% Sur 2
Si $2p_{3/2}$	103.6	**24.4**	**22.2**
Si $2p_{1/2}$	104.0	**0.0**	**0.0**
C 1s	285.0	**18.1**	**18.7**
C 1s	286.6	**3.4**	**6.3**
C 1s	288.4	**0.9**	**3.0**
N 1s	400.3	**1.7**	**3.1**
N 1s	402.9	**0.4**	**0.3**
O 1s	531.3	**1.4**	**3.0**
O 1s	533.1	**40.4**	**35.1**