Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Data

Synthesis of Mg and Zn Diolates and their Use in Metal Oxide Deposition

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SEM Images

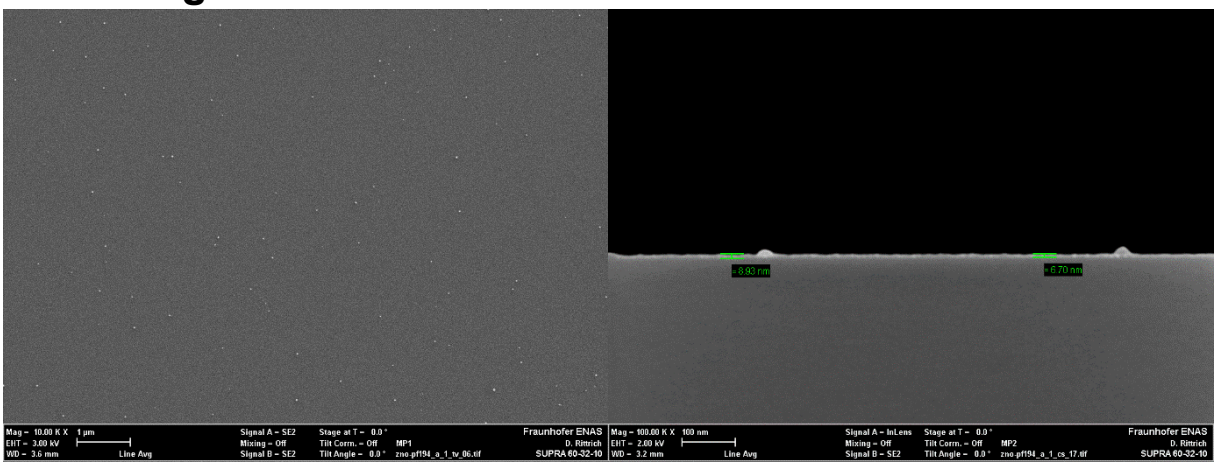


Figure S1. SEM images of as-deposited layer **A** (top view, left) and a cross section image (right) using **7** as CVD precursor, deposited on Si/SiO_2 substrates.

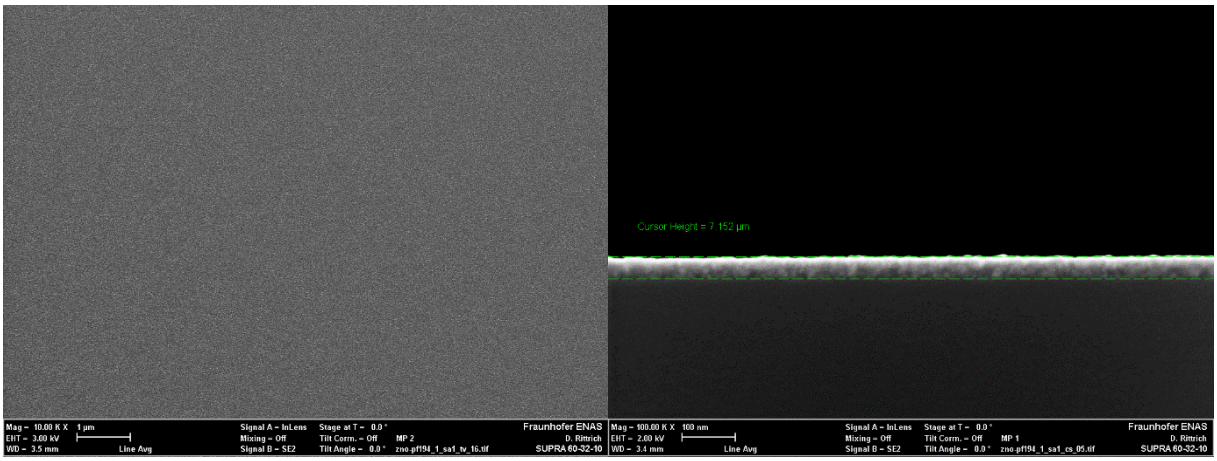


Figure S2. SEM images of as-deposited layer **B** (top view, left) and a cross section image (right) using **7** as CVD precursor, deposited on Si/SiO_2 substrates.

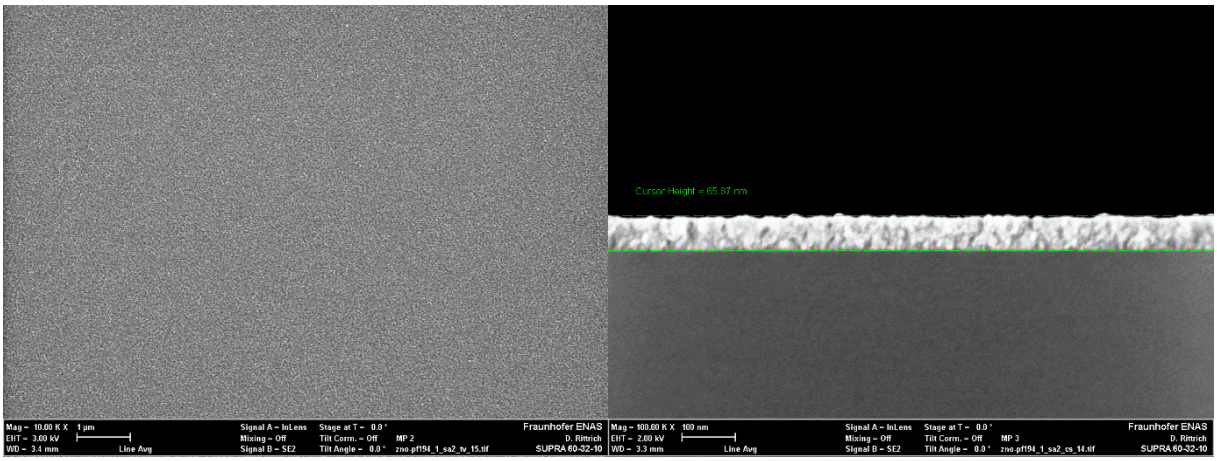


Figure S3. SEM images of as-deposited layer **C** (top view, left) and a cross section image (right) using **7** as CVD precursor, deposited on Si/SiO_2 substrates.

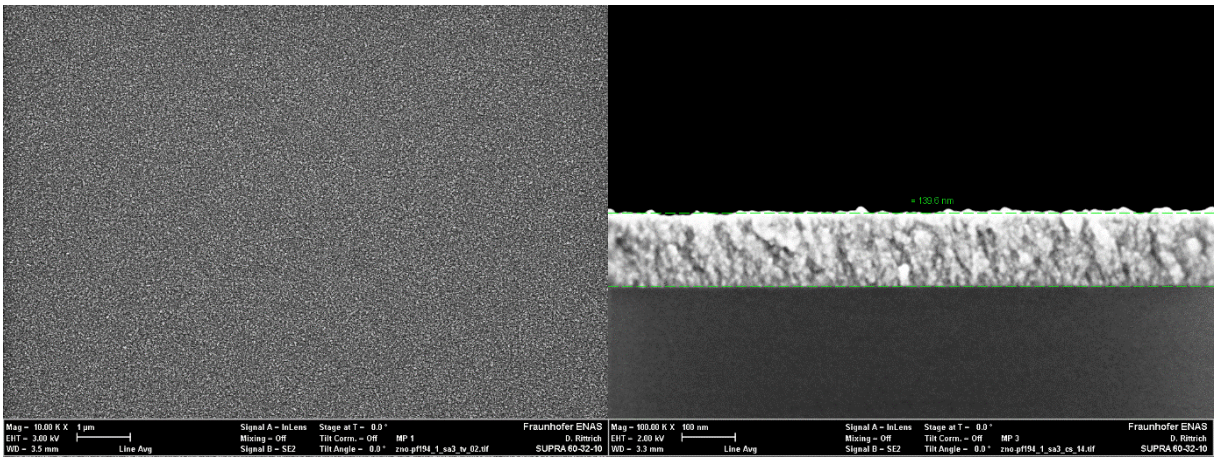


Figure S4. SEM images of as-deposited layer **D** (top view, left) and a cross section image (right) using **7** as CVD precursor, deposited on Si/SiO_2 substrates.

EDX Spectra

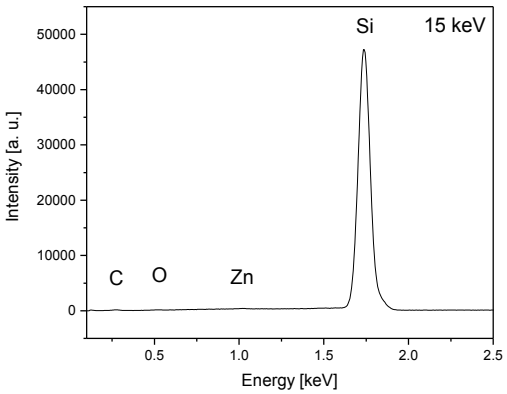


Figure S5. EDX spectra of layer **A** by using an electron beam energy of 15 keV obtained from **7** by CVD.

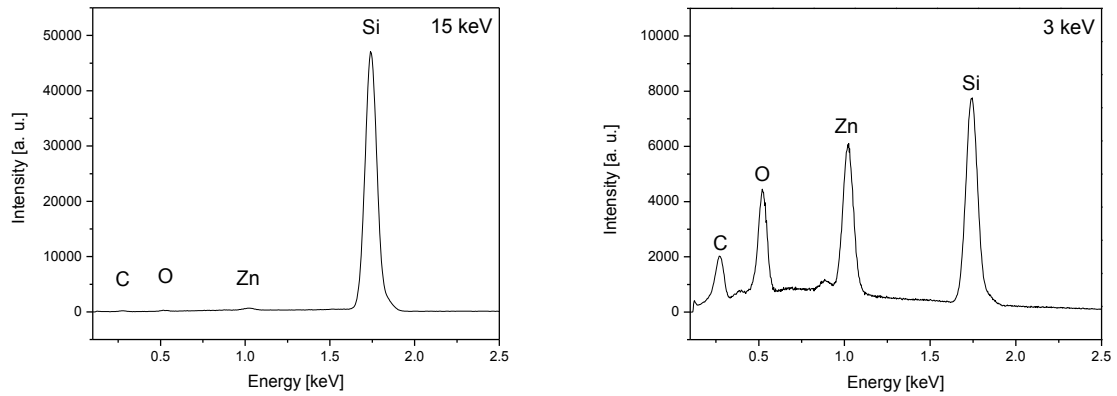


Figure S6. EDX spectra of layer **B** by using an electron beam energy of 15 keV (left) and 3 keV (right) obtained from **7** by CVD showing the characteristic pattern of Zn, O, C and Si.

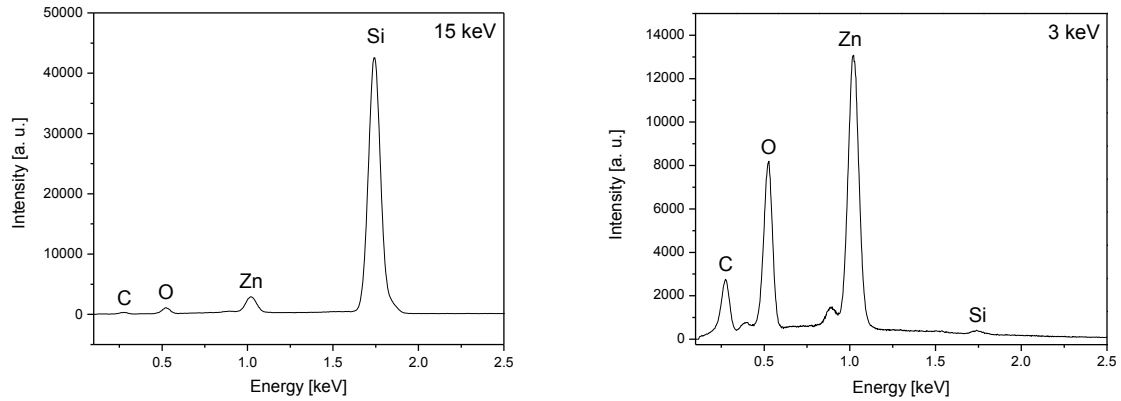


Figure S7. EDX spectra of layer **C** by using an electron beam energy of 15 keV (left) and 3 keV (right) obtained from **7** by CVD showing the characteristic pattern of Zn, O, C and Si.

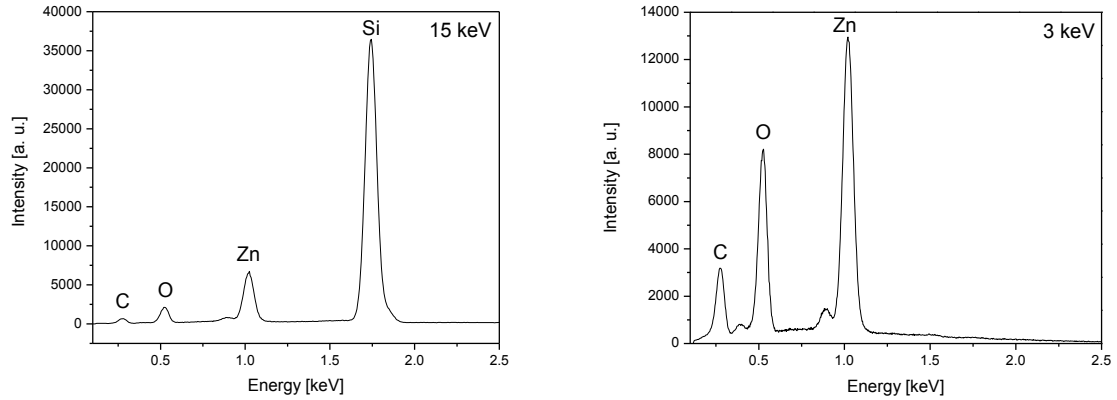


Figure S8. EDX spectra of layer **D** by using an electron beam energy of 15 keV (left) and 3 keV (right) obtained from **7** by CVD showing the characteristic pattern of Zn, O, C and Si.

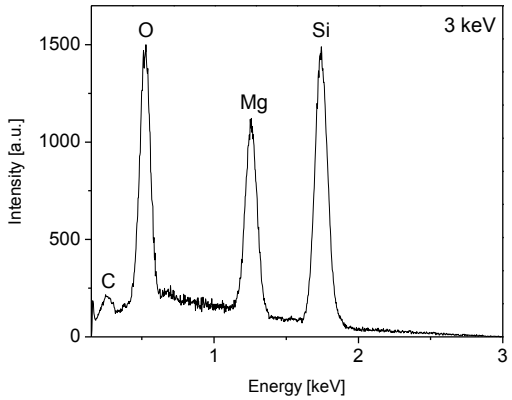


Figure S9. EDX spectrum of layer **E** by using an electron beam energy of 3 keV obtained from **5** by spin–coating showing the characteristic pattern of Mg, O, C and Si.

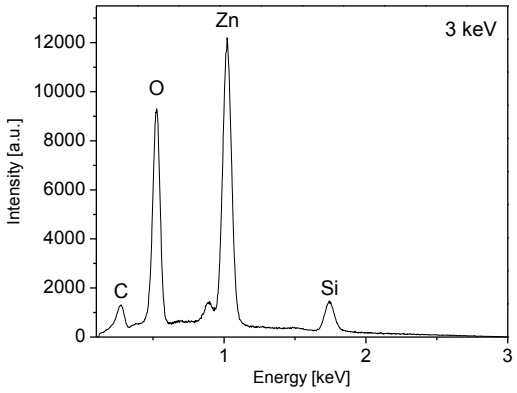


Figure S10. EDX spectrum of layer **F** by using an electron beam energy of 3 keV obtained from **7** by spin–coating showing the characteristic pattern of Zn, O, C and Si.

XPS Spectra

Survey Spectra of Layers **A**– **F**

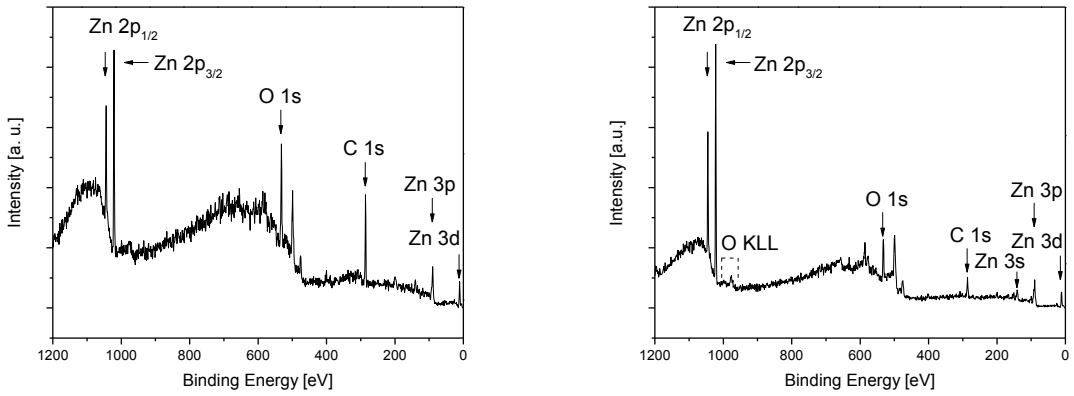


Figure S11. *Ex situ* XPS spectra of the surface (left) and of the film (right) of layer **A** obtained from **7** by CVD.

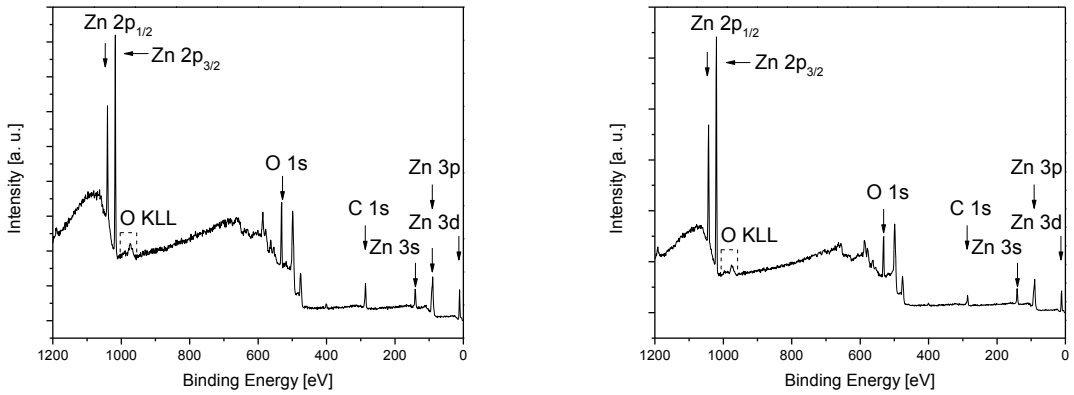


Figure S12. *Ex situ* XPS spectra of the surface (left) and of the film (right) of layer **B** obtained from **7** by CVD.

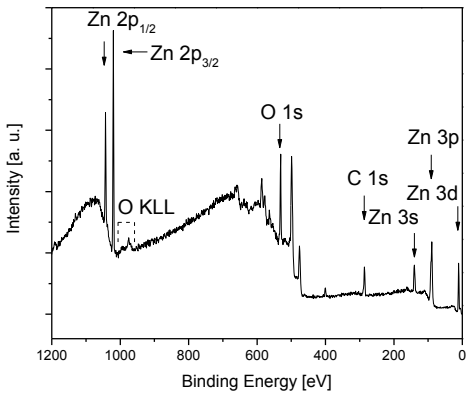


Figure S13. *Ex situ* XPS spectrum of the surface of layer **C** obtained from **7** by CVD.

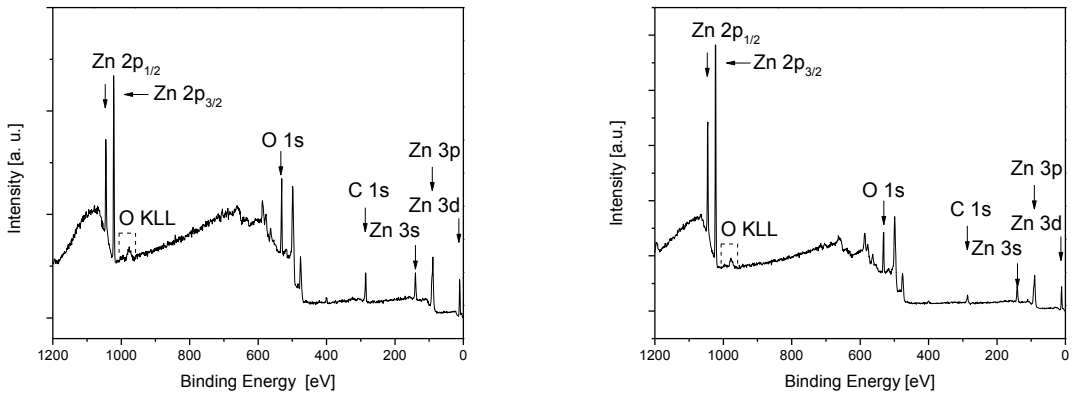


Figure S14. *Ex situ* XPS spectra of the surface (left) and of the film (right) of layer **D** obtained from **7** by CVD.

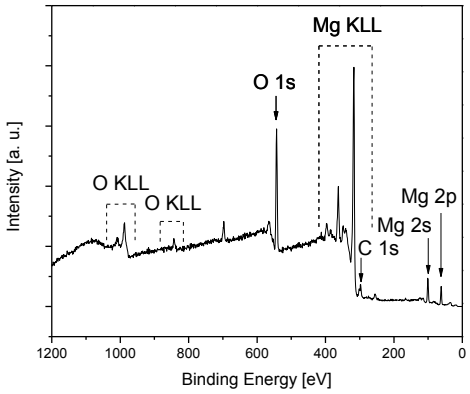


Figure S15. *Ex situ* XPS spectrum of the surface of layer **E** obtained from **5** by spin–coating.

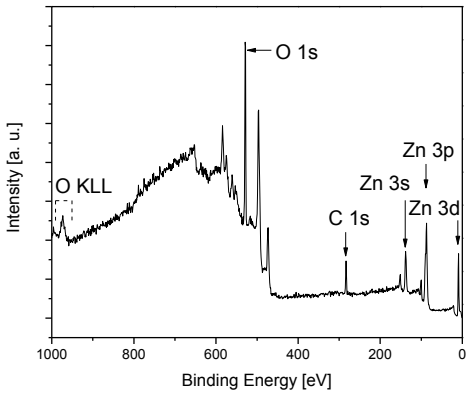
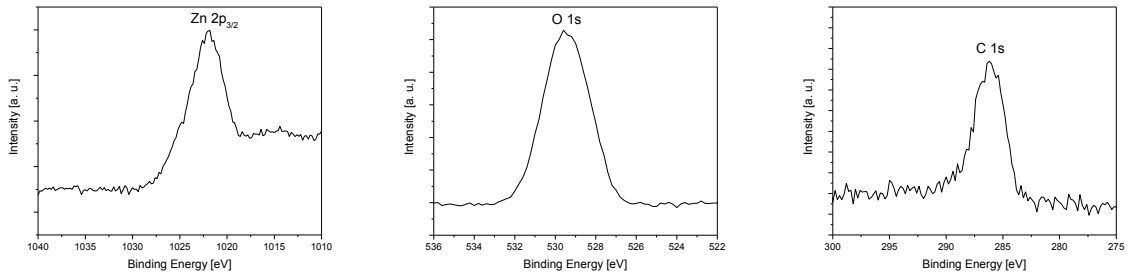


Figure S16. *Ex situ* XPS spectrum of the surface of layer **F** obtained from **7** by spin–coating.



Detailed spectra of layers **A**, **B**, **D** – **F**

Figure S17. *Ex situ* detailed XPS spectra of the Zn $2p_{3/2}$ peak (left), O 1s peak (middle) and C 1s peak (right) of layer **A** obtained from **7** by CVD.

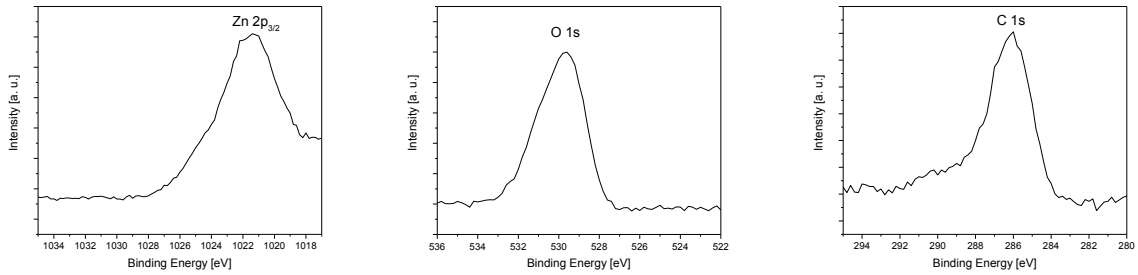


Figure S18. *Ex situ* detailed XPS spectra of the Zn $2p_{3/2}$ peak (left), O 1s peak (middle) and C 1s peak (right) of layer **B** obtained from **7** by CVD.

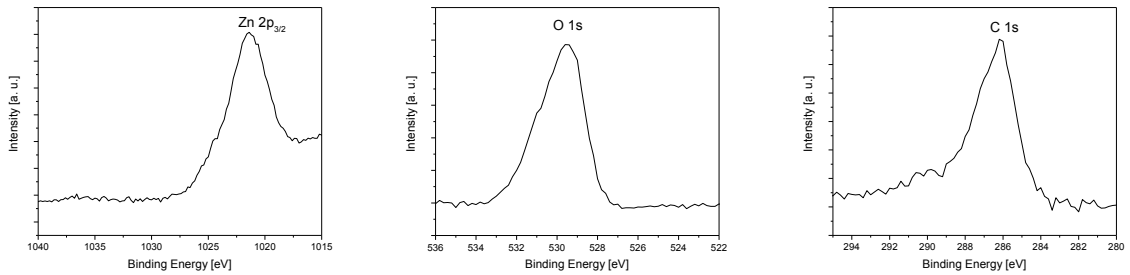


Figure S19. *Ex situ* detailed XPS spectra of the Zn $2p_{3/2}$ peak (left), O 1s peak (middle) and C 1s peak (right) of layer **D** obtained from **7** by CVD.

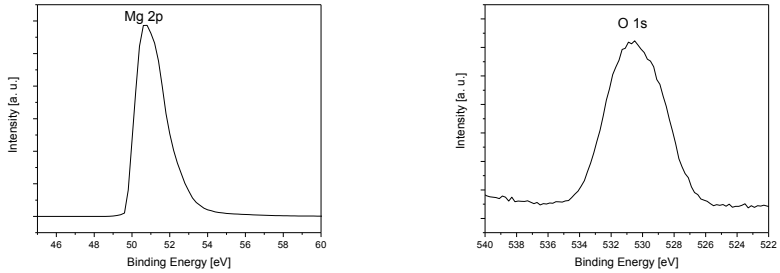
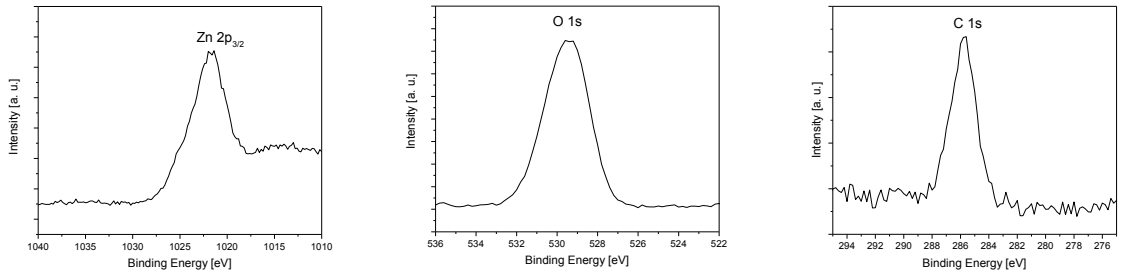


Figure S20. *Ex situ* detailed XPS spectra of the Mg 2p peak (left) and O 1s peak (right) of layer **E**



obtained from **5** by spin–coating.

Figure S21. *Ex situ* detailed XPS spectra of the Zn $2p_{3/2}$ peak (left), O 1s peak (middle) and C 1s peak (right) of layer **F** obtained from **7** by spin–coating.

GIXRD Spectra

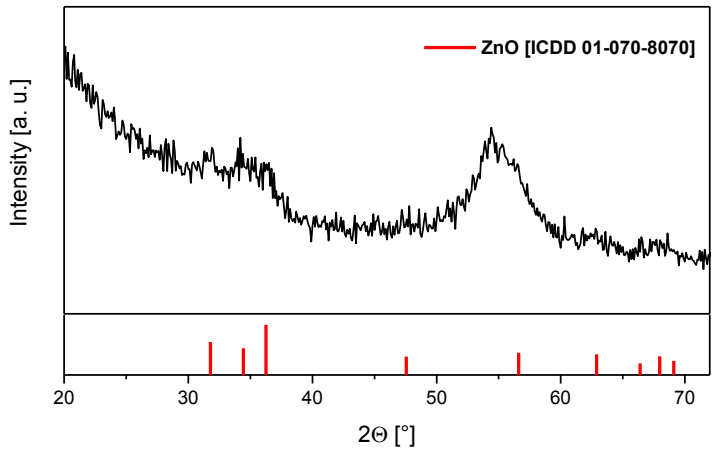


Figure S22. GIXRD spectra of layer **A** with reflections of ZnO (red), applied deposition parameters are given in Table 3.

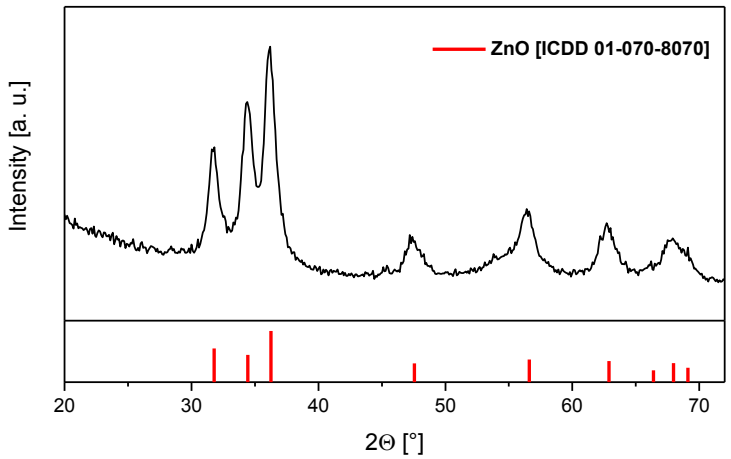


Figure S23. GIXRD spectra of layer **B** with reflections of ZnO (red), applied deposition parameters are given in Table 3.

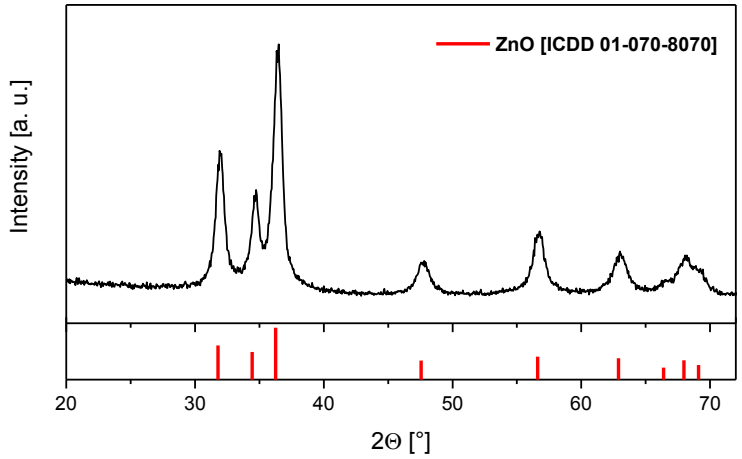


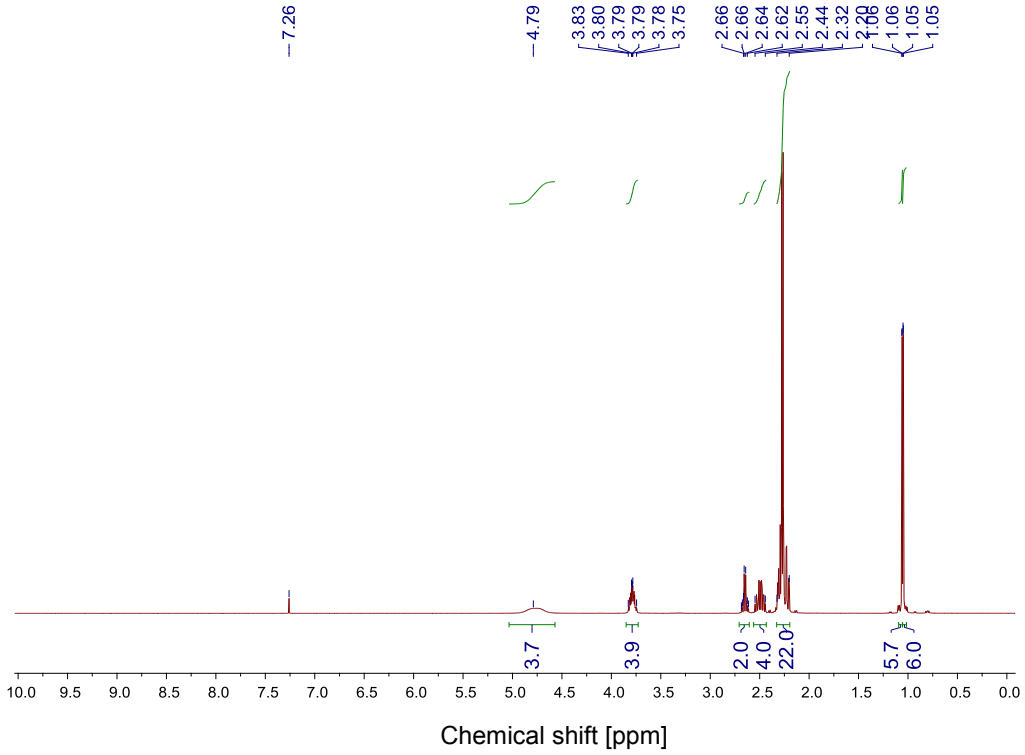
Figure S24. GIXRD spectra of layer **C** with reflections of ZnO (red), applied deposition parameters are given in Table 3.

Table S1. Elemental composition of the surface of layers **A** – **F**.

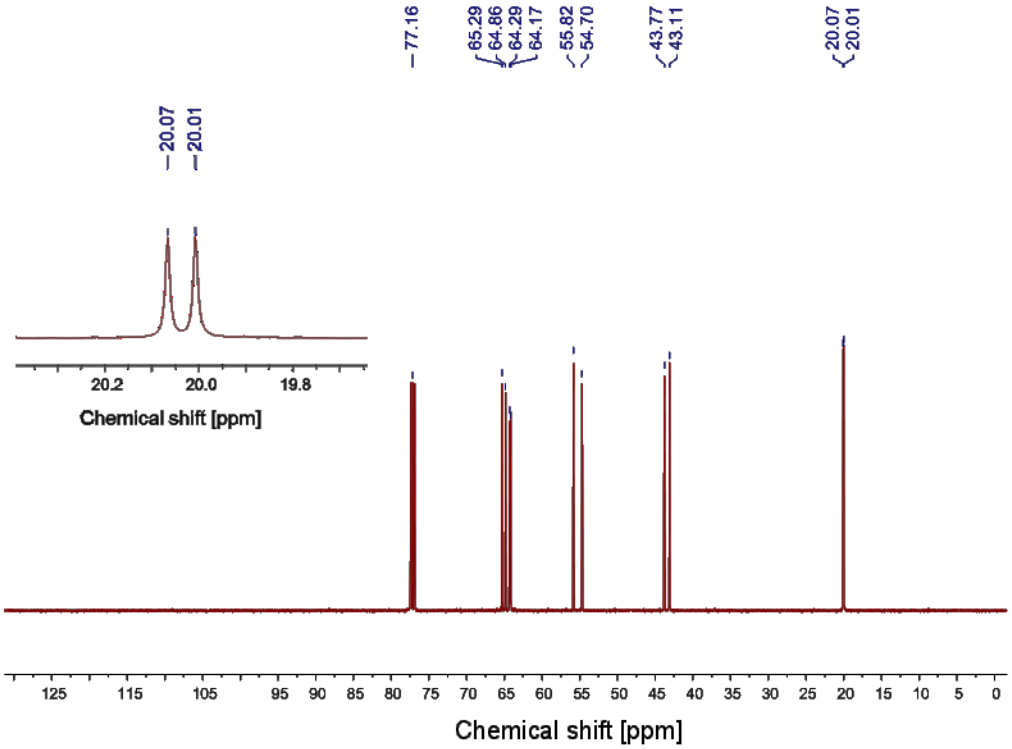
Layer	Surface composition [mol%]				
	Zn	Mg	O	C	F
A	12.2		29.8	58.0	
B	30.0		34.1	37.9	
C	28.4		36.0	35.6	
D	32.5		35.0	32.5	
E		30.9	45.2	17.6	6.3
F	30.5		51.1	18.4	

NMR Spectra

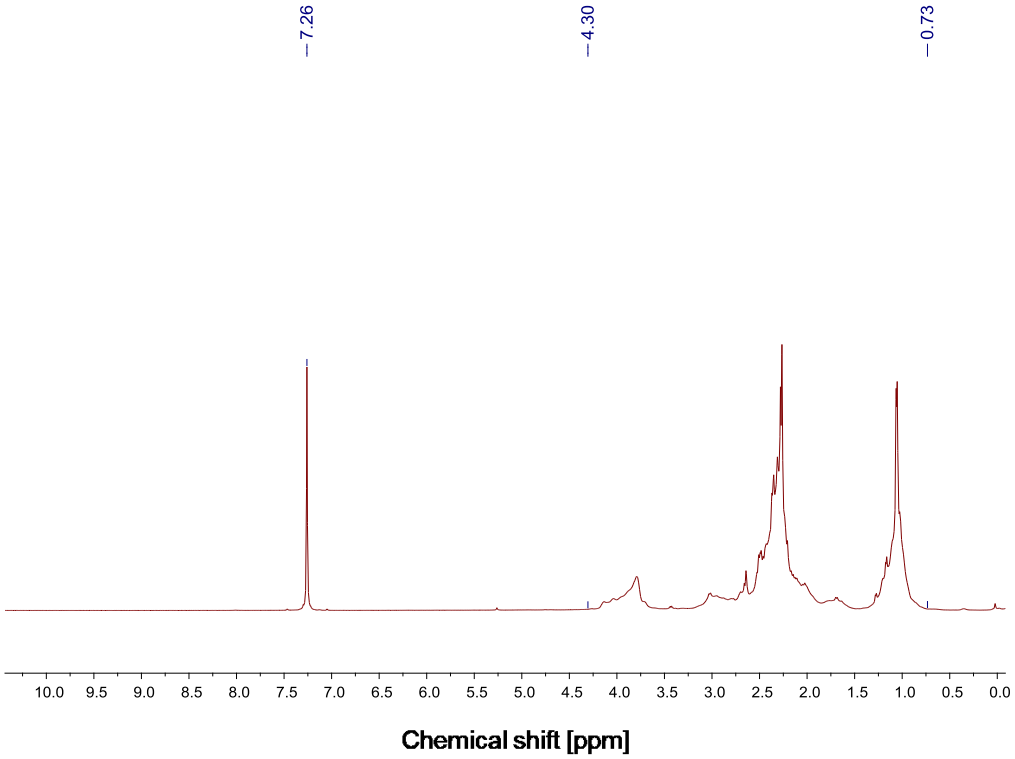
^{1}H NMR spectrum of **3** in $CDCl_3$.



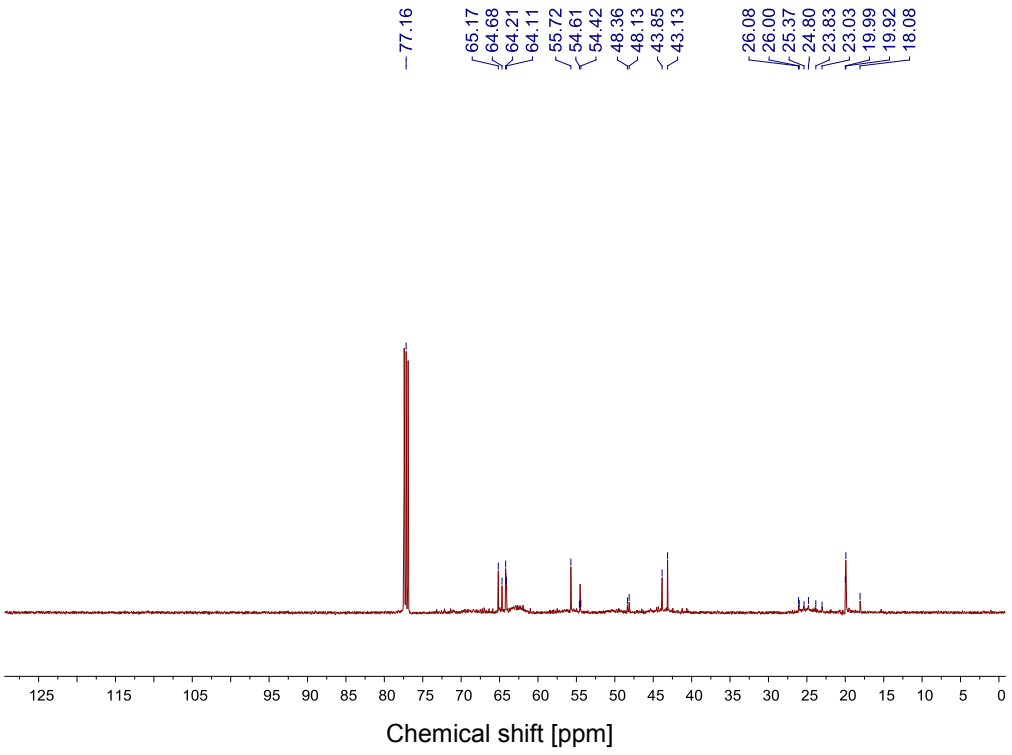
^{13}C NMR spectrum of **3** in $CDCl_3$.



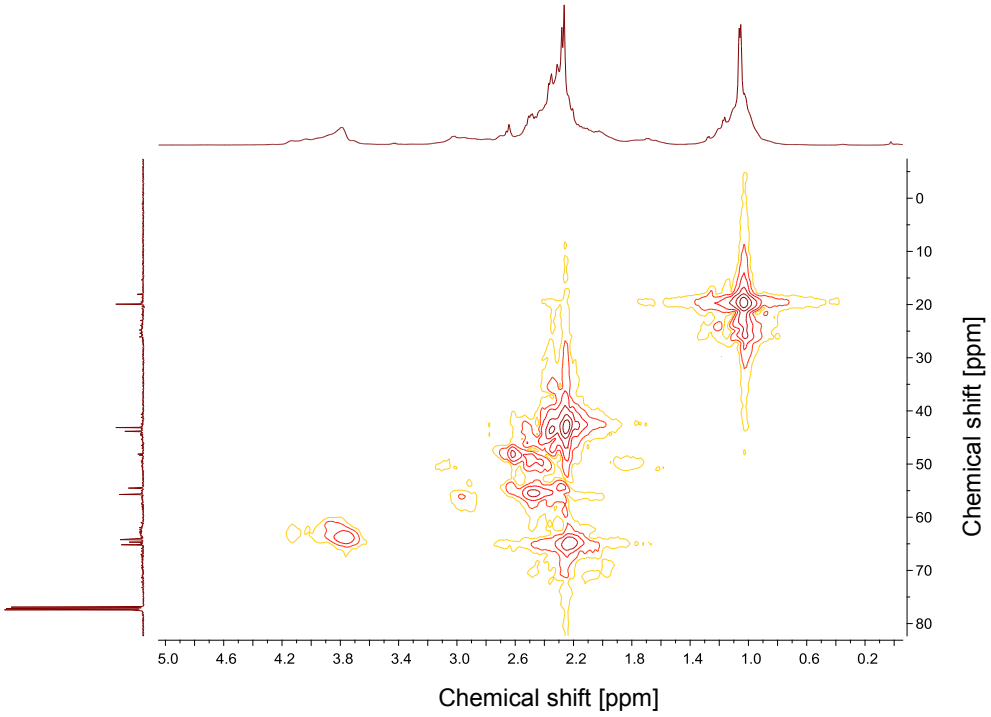
^{1}H NMR spectrum of **5** in $CDCl_3$.



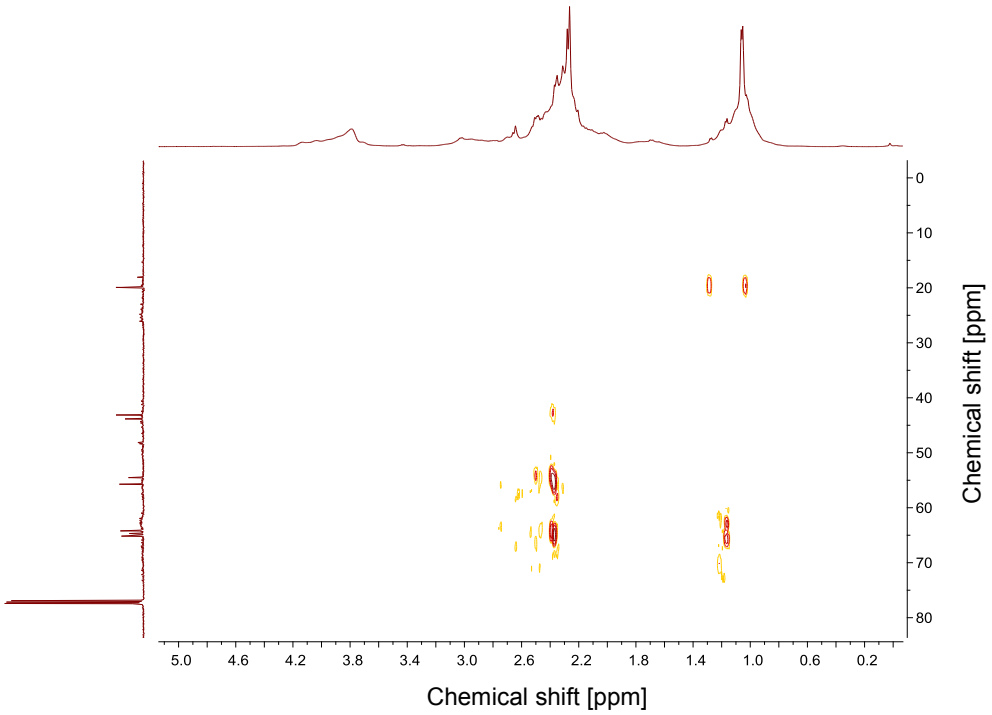
^{13}C NMR spectrum of **5** in $CDCl_3$.



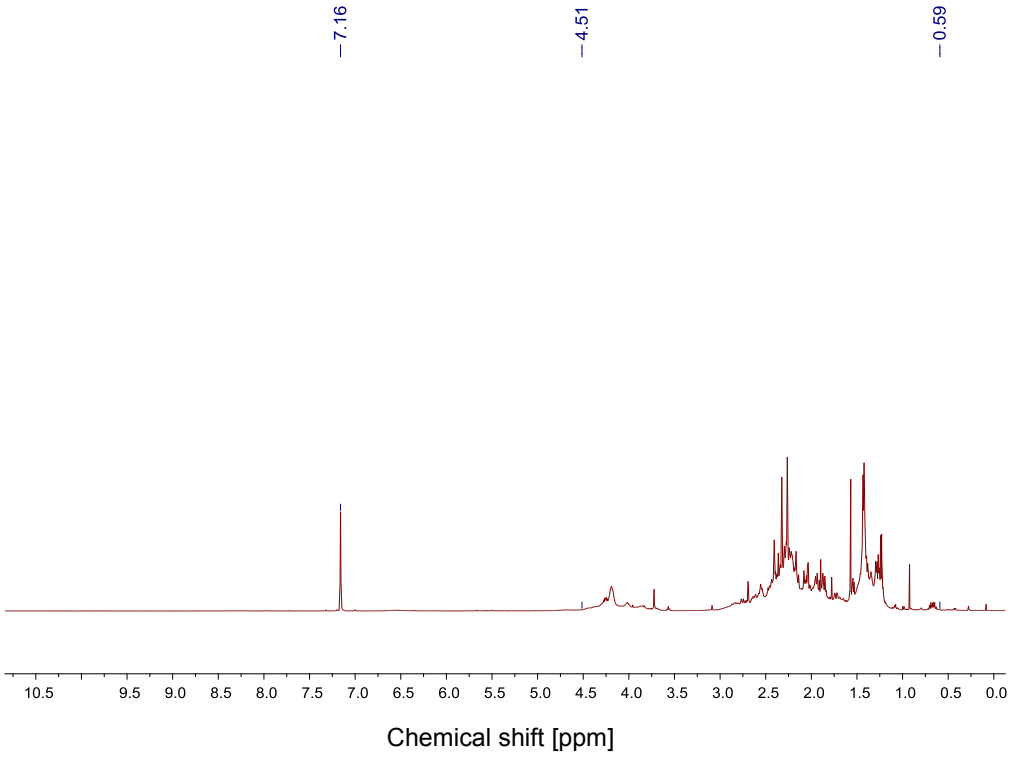
HMQC NMR spectrum of **5** in $CDCl_3$.



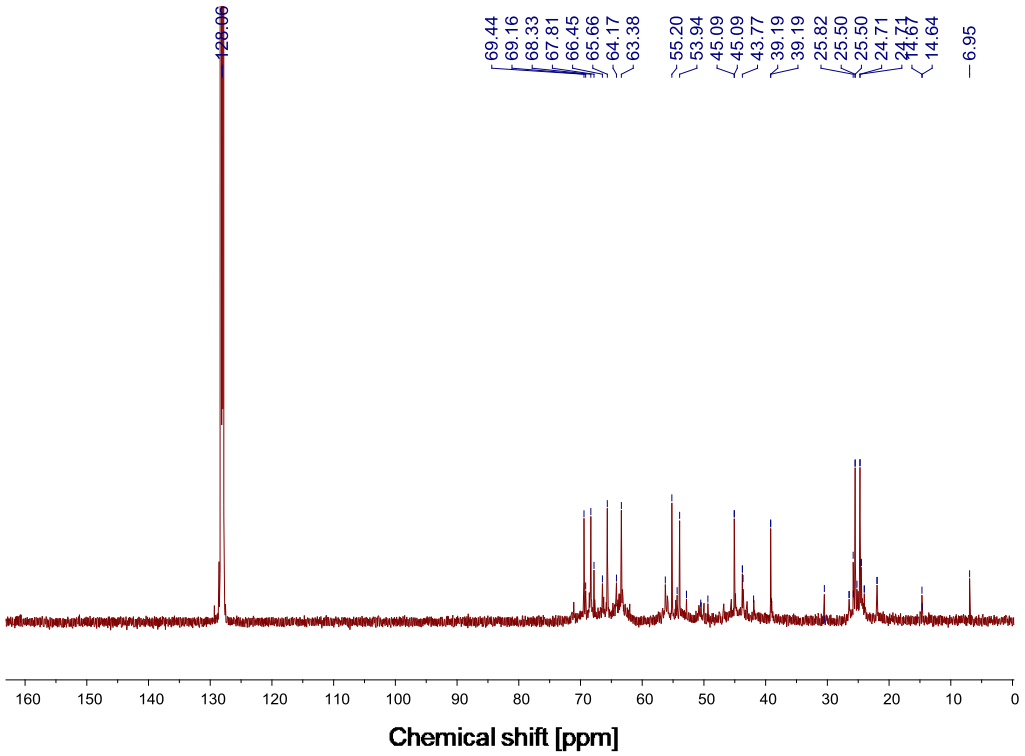
HMBC NMR spectrum of **5** in $CDCl_3$.



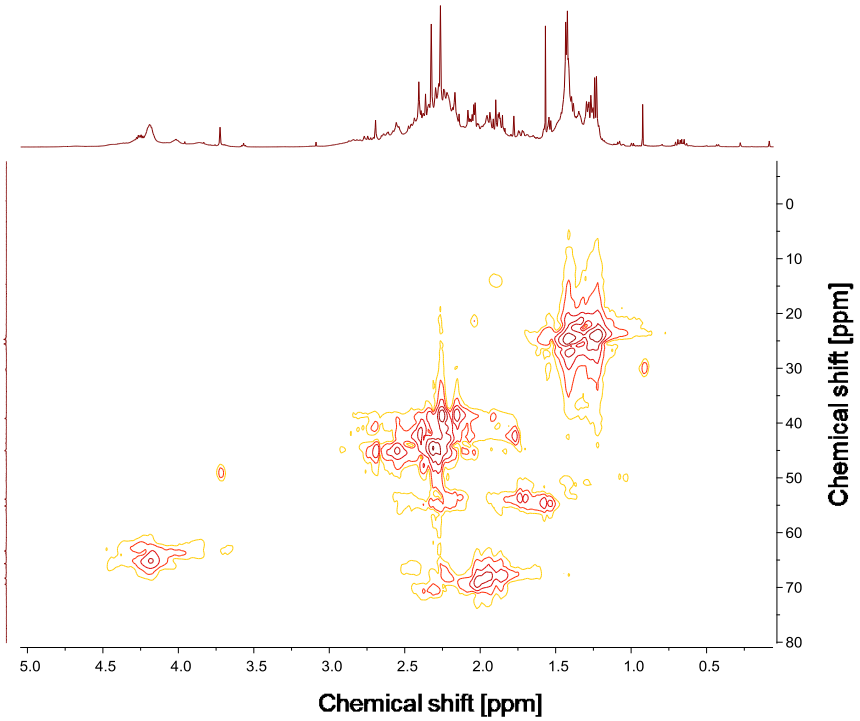
^{1}H NMR spectrum of **7** in C_6D_6



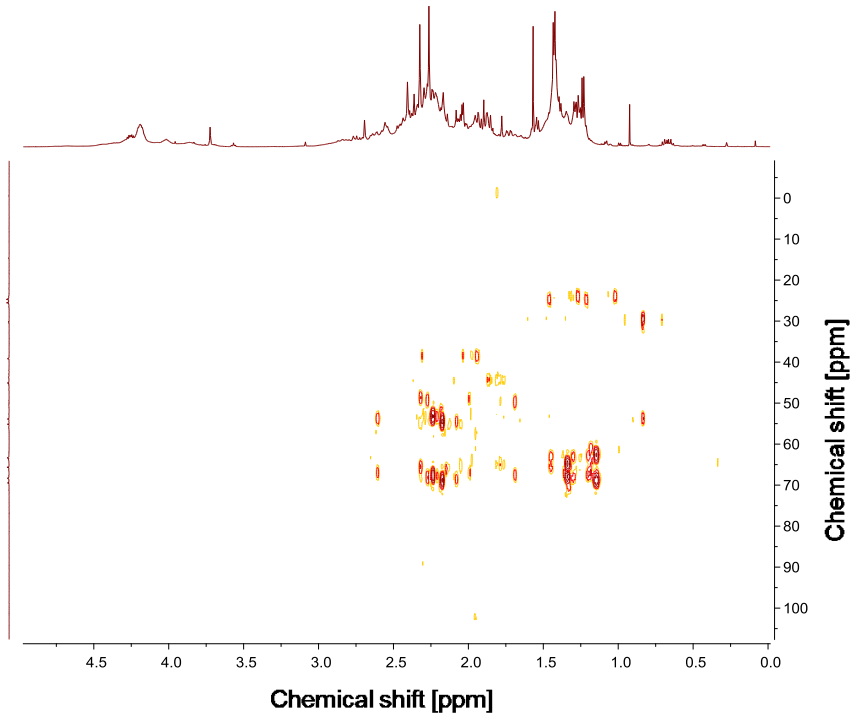
^{13}C NMR spectrum of **7** in C_6D_6



HMQC NMR spectrum of **7** in C_6D_6.

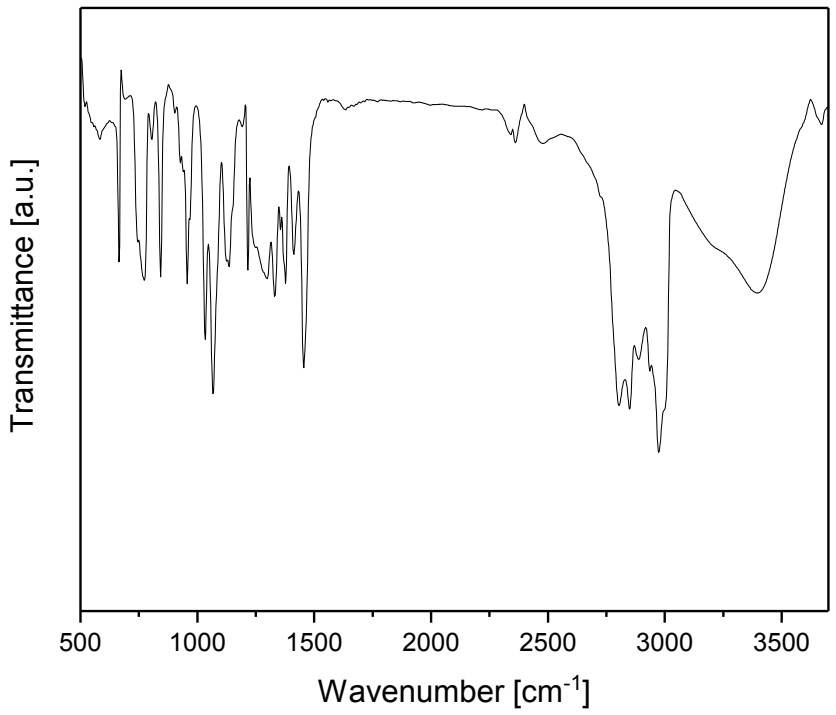


HMBC NMR spectrum of **7** in C_6D_6.

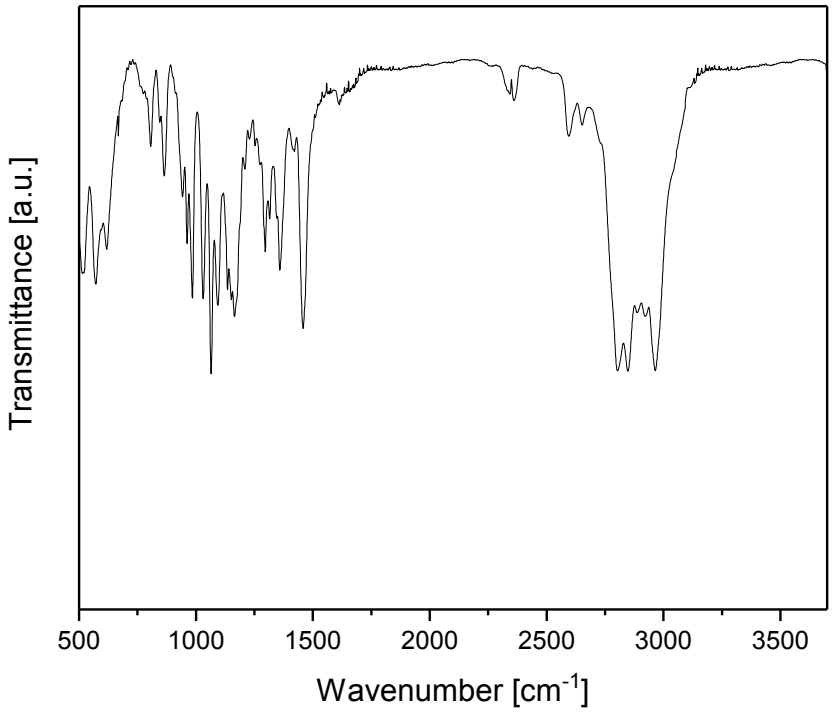


IR Spectra

IR spectrum of **3** ($CHCl_3$, NaCl).



IR spectrum of **5** (KBr).



IR spectrum of **7** (KBr).