Supplementary Information

Optical oxygen sensors show reversible cross-talk and/or degradation in presence of nitrogen dioxide

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Experimental section

Materials and Methods

All chemicals were purchased from commercial suppliers. Unless otherwise indicated, chemicals were used as received. Suppliers of indicator dyes include Frontier scientific (www.frontiersci.com), Acros Organics (now Thermo Fisher Scientific, www.thermofisher.com), Sigma Aldrich (www.sigmaaldrich.com) and Kremer Pigmente (www.kremer-pigmente.com). Details are listed in Table S1.

Fluoropore™ filters (0.45 µM un laminated PTFE Filter) were from Merck (www.merckmillipore.com), polystyrene (MW 260,000 Da) from Acros Organics (now Thermo Fisher Scientific, www.thermofisher.com), pTFEMA (MW 100,000 Da) and syndiotactic polystyrene (MW 300,000 Da) from Scientific polymer (www.scipoly.com), PSU was from Polysciences (www.polysciences.com).

3M™Dyneon Thermoplastic THV221AZ was a friendly gift from 3M (www.3mdeutschland.de), Halar® 6014 ECTFE (poly(ethylene-co-chlorotrifluoroethylene)) was generously provided by Solvay (www.solvay.com), CTL-107MK (7% wt. Cytop) was bought from AGC (www.agc.com/en/), UV/VIS grade tetrahydrofuran (THF) and toluene were from VWR (www.VWR.com), Purosolve 75/00 from Puretecs (www.puretecs.de) and fumed silica was from Sigma Aldrich (www.sigmaaldrich.com), Poly(ethyleneterephthalate) support foils Melinex 505 were aquired from Pütz (www.puetz-folien.com).

Poly(2,3,4,5,6-pentafluorostyrene) was synthesized according to literature.¹

Optical glass filters for use in combination with the lock-in amplifier were from Schott (www.schott.com) or Reichmann Feinoptik GmbH (www.reichmenn-feinoptik.de), LEDs were from Roithner (www.roithner-laser.com).

SEC chromatographic analysis was performed on a WGE Dr. Bures SEC3010 (www.wge-dr-bures.de) with THF as eluent (1 mL min⁻¹) and refractive index (RI) detection. Poly(styrene) standards were used for calibration.

IR spectra were taken on an ALPHA-P FT-IR spectrometer from Bruker (www.bruker.com) with a diamond-based attenuated total reflection (ATR) module.

Dyes

The indicator dyes were either purchased from commercial suppliers or synthesized according to literature procedures, the details are summarized in Table S1.
| Dye                                                                 | Abbreviation | Reference or commercial supplier |
|--------------------------------------------------------------------|--------------|----------------------------------|
| Platinum(II)-2,3,7,8,12,13,17,18-octaethylporphyrin                | PtOEP        | Frontier Scientific              |
| Platinum(II)-5,10,15,20-tetrakis-(2,3,4,5,6-pentafluorophenyl)-porphyrin | PtTFPP       | Frontier Scientific              |
| Palladium(II)-5,10,15,20-tetrakis-(2,3,4,5,6-pentafluorophenyl)-porphyrin | PdTFPP       | Frontier Scientific              |
| Platinum(II)-meso-tetra-4-fluorophenyltetrabenzoporphyrrin         | PtTPTBPF     | Hutter et al. 2014              |
| Platinum(II)-meso-tetra-4-fluorophenyltetrabenzoporphyrrin         | PdTPTBPF     | Hutter et al. 2014              |
| Platinum(II)-5-aza-10,15,20-triphenyltetra(4-tert-butyl)benzoporphyrrin | PtNTPTBP     | Borisov et al. 2010              |
| Platinum(II) meso-tetra-(4-fluorophenyl)-tetra-(2-ethylhexylsulfonyle)benzoporphyrrin | PtSO₂TPTBP | Zach et al. 2017               |
| Platinum(II) meso-tetra-(4-fluorophenyl)-tetra(4-bis(2-ethylhexylsulfonyle)benzoporphyrrin | Pt8SO₂TPTBP | Zach et al. 2017               |
| Palladium(II) meso-tetra-(4-fl uorophenyl)-tetra(4-bis(2-ethylhexylsulfonyle)benzoporphyrrin | Pd8SO₂TPTBP | Zach et al. 2017               |
| Platinum(II) meso-tetra-(3,5-di-tert-butylphenyl)tetranaphthoquinonoporphyrrin | PtTBUPTNQP | Banala et al. 2016              |
| Iridium(III) bis-(3-(benzothiazol-2-yl)-7-((diethylamino)-coumarin)acetylacetonate | Ir(C₅H₆)acac | Borisov et al. 2007              |
| Iridium(II) [4,6-di(4-tert-butylphenyl)pyrimidine 2-[3-tert-butyl-5-(1-phenyl-1H-1,3-benzodiazo-2-yl)phenyl]-1-phenyl-1H-1,3-benzodiazo] chloride | Ir(Bu-dpp)PhbibCl | Shafikov et al. 2019 |
| Platinum(II) 3-(benzothiazol-2-yl)-7-((diethylamino)-coumarin acetylacetonate | PtC₆acac | Borisov et al. 2009              |
| Platinum(II) 2,3-bis[(4-dibutylamino-2-hydroxybenzylidene)amino]but-2-enedinitrile | PtDBA | Borisov et al. 2013              |
| Ruthenium (II) tris(4 7-diphenyl-10-phenthaline) trimethylsilylpropansulfonate | Ru(dpp)TMS₂ | Klimant et al. 1995              |
| Zirconium(II) 2,6-bis(5-mesityl-3-phenyl-1H-pyrrol-2-yl)pyridine | Zr-PDP | Zhang et al. 2020               |
| Tetra-(3,6-(2-ethylhexyl)-9H-carbazole)-1,2-dicyanobenzene | 4CzDCB | Steinegger et al. 2017           |
| Europium(III) tris[9-(hydroxy-ω-O)-1H-phenalenol-1-onatorO]-1,1',9,9'-dimethyl-9H-xanthene-4,5-diybis-1,1'-diphenyl-phosphine oxide | Eu(HPH₃)₂DDXPO | Borisov et al. 2014              |
| Europium(III) tris-thenoynitrilfluoro acetonat trihydrate | Eu(tta)₃H₂O | Acros Organics                   |
| Europium(III) tris-thenoynitrilfluoro acetonat 4-(4,6-di(3,5-dimethyl-1H-pyrazol-1-yl)-1,3,5-triazin-2-yl)-N,N-diethylbenzenamine | Eu(tta)₃DEADPT | Yang et al. 2004               |
| Europium(III) tris-thenoynitrilfluoro acetonat 4-(4,6-bis(1H-indazol-1-yl)-1,3,5-triazin-2-yl)-N,N-diethylbenzenamine | Eu(tta)₃DEADIT | Borisov et al. 2008             |
| Poly(9,9-dihexylfluorene-alt(2,1,3)-benzothiadizole) | Conjugated polymer | Herguth et al. 2002          |
| 3-(2'-benzothiazolyl)-7-diethylaminocoumarin | Coumarin 6 | Aldrich                         |
| BF₆: chelate of [5-(4-buthoxyphenyl)-3-phenyl-1H-pyrrol-2-yl][5-(4-buthoxyphenyl)-3-phenylpyrrol-2-ylidene]-amine | diBuO-aza-BOĐIpy | Strobl et al. 2015           |
| N,N'-bis(2,6-diisopropylphenyl)perylene-3,4,9,10-tetracarboxydiimide | Lumogen F Orange | Kremer Pigmente                |
| 1,6,7,12-Tetrachloro-N,N'-bis(2,6-diisopropylphenyl)perylene-3,4,9,10-tetracarboxydiimide | 4CI-PBI | Seybold et al. 1988           |
**Immobilization of dyes in polymers**

All foils of polystyrene-immobilized dyes were produced in a similar fashion. First, a sensor “cocktail” was prepared containing the respective dye and the polymer dissolved in a suitable solvent with a concentration of 10% wt. of polymer in the solvent. This “cocktail” was stirred for several hours until all the components were fully dissolved. Then ~200 µL were pipetted onto a PET support foil and knife coated with a wet film thickness of 76.2 µm. Immediately after knife coating, a Fluoropore™ Teflon filter was carefully placed on top of the still wet sensor foil so that the cocktail would soak into the filter pores. The foils were then left to dry at room temperature for several hours.

*Table S2* summarizes the concentrations of dyes in PS and the type of solvent used for the PS-based foils. For PtTFPP, PtTPTBP and Pt8SO2TPTBP in other polymers, the indicator concentrations in polymers were 1.3 % wt. for PtTFPP and 1.5 % wt. for PtTPTBP and Pt8SO2TPTBP. THF was used to as a solvent in “cocktails” based on pPFS, PSU, pTFEMA and Dyneon. Toluene was used for “cocktails” based on PS-Br and poly(aryl ethers).

*Table S2. Compositions of PS-based “cocktails”*

| Indicator        | Weight % of indicator with respect to PS | solvent   |
|------------------|----------------------------------------|-----------|
| PtOEP            | 1.3                                    | Toluene   |
| PtTFPP           | 1.3                                    | Toluene   |
| PdTFFP           | 1.3                                    | THF       |
| PtTPTBP         | 1.5                                    | Toluene   |
| PdTPTBP         | 1.5                                    | Toluene   |
| PNTBP           | 1.1                                    | Toluene   |
| Pt4SO2TPTBP     | 1.5                                    | Toluene   |
| Pt8SO2TPTBP     | 1.5                                    | Toluene   |
| Pd8SO2TPTBP     | 1.5                                    | Toluene   |
| PtTrBuPTNQP     | 0.6                                    | Toluene   |
| Ir(C5)2acac     | 1.5                                    | THF       |
| Ir(tBu-dpp)PhbibCl | 1                                      | THF       |
| PtC6acac       | 1                                      | THF       |
| PtDBA           | 1                                      | Toluene   |
| Ru(dpp)3TMS2    | 1.2                                    | THF       |
| Zr-PDP          | 1.5                                    | Toluene   |
| 4CzDCB          | 1                                      | Toluene   |
| Eu(HPhN3)3DDXPO | 1.5                                    | THF       |
| Eu(tta)3·3H2O   | 1.5                                    | THF       |
| Eu(tta)3DEADPT  | 1.5                                    | Toluene   |
| Eu(tta)3DEADIT  | 1.5                                    | Toluene   |
| Conjugated polymer | 10                                  | Toluene   |
| Coumarin 6      | 1                                      | THF       |
| diBuO-aza-BODIPY| 1                                      | Toluene   |
| Lumogen F Orange| 0.5                                    | THF       |
| 4Cl-PBI         | 0.5                                    | THF       |
The read-out of fluorescence and phosphorescence response of the dyes was performed with either a FireSting®-O₂ employing RedFlash technology, a custom model FireSting®-Pro equipped with a blue excitation source, both from PyroScience (www.pyroscience.com) or a lock-in amplifier from Stanford Research Systems (www.thinksrs.com) equipped with a PMT module (H5701–02) from Hamamatsu, (www.sales.hamamatsu.com) with LEDs and filters chosen to match the respective dye’s spectral properties. The modulation frequency was tuned depending on the unquenched lifetime of the dyes as well. Table S3 gives an overview which phase fluorometer and modulation frequency and, in the case of lock-in amplifier, what LED and filters were used.

Table S3. Settings for phase-fluorometric measurements

| Indicator          | Phase fluorometer | LED (peak wavelength) | Excitation filter | Emission filter | Modulation frequency |
|--------------------|-------------------|-----------------------|-------------------|----------------|----------------------|
| PtOEP              | Lock-in amplifier | Blue (413 nm)         | BG12              | OG570          | 4000 Hz              |
| PtTFPP             | Lock-in amplifier | Blue (413 nm)         | BG12              | OG570          | 4000 Hz              |
| PdTFPP             | Lock-in amplifier | Blue (413 nm)         | BG12              | OG570          | 153 Hz               |
| PtTPTBPF           | FireSting®-O₂     |                       |                   |                | 4000 Hz              |
| PdTPTBPF           | FireSting®-O₂     |                       |                   |                | 4000 Hz              |
| PtNTBP             | FireSting®-O₂     |                       |                   |                | 4000 Hz              |
| Pt4SO₂TPTBP        | FireSting®-O₂     |                       |                   |                | 4000 Hz              |
| Pt8SO₂TPTBP        | FireSting®-O₂     |                       |                   |                | 4000 Hz              |
| Pd8SO₂TPTBP        | FireSting®-O₂     |                       |                   |                | 400 Hz               |
| PtTrBuPTNQP        | Lock-in amplifier | Green (501 nm)        | BG36              | OG630          | 4000 Hz              |
| Ir(C₅)₂acac        | FireSting®-Pro    |                       |                   |                | 20 kHz               |
| Ir(tBu-dpp)PbibCl  | FireSting®-Pro    |                       |                   |                | 32 kHz               |
| PtC₆acac           | FireSting®-Pro    |                       |                   |                | 4000 Hz              |
| PtDBA              | FireSting®-O₂     |                       |                   |                | 4000 Hz              |
| Ru(dpp)₂TMS₂       | FireSting®-Pro    |                       |                   |                | 800 Hz               |
| Zr-PDP             | FireSting®-Pro    |                       |                   |                | 10 kHz               |
| 4Cl-Derb           | FireSting®-Pro    |                       |                   |                | 10 kHz               |
| Eu(HPhN)₂DDXPO     | FireSting®-Pro    |                       |                   |                | 2000 Hz              |
| Eu(tta)₃H₂O        | Lock-in amplifier | UV (355 nm)           | UG1               | OG570          | 400 Hz               |
| Eu(tta)₃DEADPT     | Lock-in amplifier | Blue (413 nm)         | BG12              | OG570          | 500 Hz               |
| Eu(tta)₃DEADIT     | Lock-in amplifier | Blue (413 nm)         | BG12              | OG570          | 500 Hz               |
| Conjugated polymer | FireSting®-Pro    |                       |                   |                | 4000 Hz              |
| Coumarin 6         | FireSting®-Pro    |                       |                   |                | 4000 Hz              |
| diBuO-aza-BODIPY   | FireSting®-O₂     |                       |                   |                | 4000 Hz              |
| Lumogen F Orange   | FireSting®-Pro    |                       |                   |                | 4000 Hz              |
| 4Cl-PBI            | FireSting®-Pro    |                       |                   |                | 4000 Hz              |

PtTFPP and PtTPTBP in sPS sPS was pre-dissolved in CHCl₃ by heating to 150 °C for 10 minutes in a Monowave 50 synthesis reactor by Anton Paar (www.anton-paar.com). After cooling to room temperature the solution remained stable for several hours. The concentration of PtTFPP was 1.3% wt. with respect to sPS and of
PtTPTBPF - 1.5% wt. with respect to sPS. The respective amount of dye was added to the polymer solution, homogenized by stirring vigorously for ca. 15 minutes and then knife-coated on a PET support with a wet film thickness of 76.2 μm. No Teflon filter was added as the fast evaporation of CHCl₃ would not allow for the “cocktail” to soak into the pores.

PtTFPP on fumed silica in Cytop (FS-Cytop)
One sensor foil was produced with PtTFPP coupled to fumed silica and dispersed in Cytop CTL-107MK. The coupling process was conducted according to literature procedure.¹⁹ 50 mg of the modified particles were then dispersed in a “cocktail” containing 720 mg of CTL-107MK and 780 mg Purosolve 75/00. The “cocktail” was stirred for several hours until homogenous distribution was achieved and then knife-coated on an SiOₓ-modified PET foil.

PtTFPP in ECTFE
1.5 mg PtTFPP and 99.8 mg ECTFE were added to a 2.5 mL glass vial and 910 mg 1,3-dichlorobenzene were added. The mixture was heated in a stainless steel heating block to 170 °C until ECTFE dissolved. Glass discs with one roughened side (diameter 8 mm, hight 1 mm) were used as a transparent support instead of PET due to poorer stability of the latter at high temperatures. The glass discs also were placed on the heating block and a small portion of “cocktail” was homogenously applied to the roughened side of the hot glass disc using a heated glass pipette. Then the discs were left on the hot heating block for another 15 minutes to evaporate the solvent, after which the heating was turned off to let the discs slowly cool to room temperature.

Poly(aryl ether) polymers
The structures of the synthesized poly(aryl ethers) are shown in Figure S1, their synthesis was conducted analogously to a procedure published by Liu et al. in 2003.²⁰ Table S4 shows results of SEC chromatography of the synthesized poly(aryl ether) polymers, Figure S2 contains the IR spectra.

![Figure S1. Poly(aryl ether) polymer structures](image-url)
Table S4. Results of GPC analysis of poly(aryl ether) polymers

|     | Mn / g mol⁻¹ | Mw / g mol⁻¹ | PDI |
|-----|--------------|--------------|-----|
| M99 | 4859         | 11034        | 2.27|
| M112| 10200        | 16604        | 1.63|
| M123| 8120         | 12968        | 1.60|
| M127| 12975        | 21887        | 1.69|

Figure S2. ATR-IR spectra of poly(aryl ether) polymers

Results
An example of a typical measurement is provided in Figure S3 for two dyes, Pt8SO₂TPTBP and PtTPTBPF, both in PS.

Degradation of dyes due to exposure to small (180 ppm) and high (5500 ppm) concentrations of NO₂ (about 15 minutes exposure time) was determined by comparing the lifetime and intensity of luminescence of PS-based sensor foils in N₂ before any exposure to NO₂ as well as after exposure to the respective concentrations of NO₂. The same was done with materials based on PtTFPP, PtTPTBPF and Pt8SO₂TPTBP in different polymers. The results are depicted in Figure 2.

Additionally, absorption spectra of PS-based foils were recorded before exposure to NO₂, after exposure to 180 ppm NO₂ over a duration of 10 minutes and after exposure to 5500 ppm NO₂ over a duration of 30 minutes. In these cases, exposure to NO₂ took place in darkness so no additional photodegradation took place. The results can be seen in Figures S4-S11.
Changes in absorption spectra and luminescent properties of selected dyes (Ir(C₅)₃acac, PtTPTBP, Ru(dpp)₃(TMS)₂ and PtOEP) dissolved in toluene upon exposure to NO₂ as well as mass spectroscopic analysis of resulting products are summarized in Figures S12-S22.

The stability of materials based on PtTFPP, PtTPTBP and Pt8SO₂TPTBP in different polymers towards NO₂ was determined as for the PS-based sensors, the results are depicted in Figures S23 & S24 and in Figure 4.

Figure S3. Measurement of luminescence response to NO₂ exposure. Left: Pt8SO₂TPTBP in PS, Right: PtTPTBP in PS
Figure S4. Absorption spectra of PS foils with immobilized porphyrins before exposure to NO₂, after exposure to 180 ppm NO₂ for 10 minutes, and after exposure to 5500 ppm NO₂ for 30 minutes. The right row shows absorption spectra normalized to the most intense absorption band.
Figure S5. Absorption spectra of PS foils with immobilized π-extended porphyrins before exposure to NO$_2$, after exposure to 180 ppm NO$_2$ for 10 minutes, and after exposure to 5500 ppm NO$_2$ for 30 minutes. The right row shows absorption spectra normalized to the most intense absorption band.
Figure S6. Absorption spectra of PS foils with immobilized π-extended porphyrins before exposure to NO₂, after exposure to 180 ppm NO₂ for 10 minutes, and after exposure to 5500 ppm NO₂ for 30 minutes. The right row shows absorption spectra normalized to the most intense absorption band.
Figure S7. Absorption spectra of PS foils doped with various phosphorescent complexes before exposure to NO₂, after exposure to 180 ppm NO₂ for 10 minutes, and after exposure to 5500 ppm NO₂ for 30 minutes. The right row shows absorption spectra normalized to the most intense absorption band.
Figure S8. Absorption spectra of PS foils doped with various phosphorescent complexes before exposure to NO$_2$, after exposure to 180 ppm NO$_2$ for 10 minutes, and after exposure to 5500 ppm NO$_2$ for 30 minutes. The right row shows absorption spectra normalized to the most intense absorption band.
Figure S9. Absorption spectra of PS foils doped with europium complexes before exposure to NO₂, after exposure to 180 ppm NO₂ for 10 minutes, and after exposure to 5500 ppm NO₂ for 30 minutes. The right row shows absorption spectra normalized to the most intense absorption band.
Figure S10. Absorption spectra of PS foils doped with fluorescent dyes before exposure to NO$_2$, after exposure to 180 ppm NO$_2$ for 10 minutes, and after exposure to 5500 ppm NO$_2$ for 30 minutes. The right row shows absorption spectra normalized to the most intense absorption band.
Figure S11. Absorption spectra of PS foils doped with fluorescent dyes before exposure to NO2, after exposure to 180 ppm NO2 for 10 minutes, and after exposure to 5500 ppm NO2 for 30 minutes. The right row shows absorption spectra normalized to the most intense absorption band.
Figure S12. Absorption spectra of Ir(Cs)$_2$acac dissolved in toluene ($C \sim 1.4 \cdot 10^{-5}$ mol·L$^{-1}$) before (0 min) and after (1-15 min) exposure to NO$_2$ ($C \sim 1.5 \cdot 10^{-4}$ mol·L$^{-1}$).

Figure S13. Response of luminescence intensity (above) and decay time (below) of Ir(Cs)$_2$acac in toluene ($C \sim 1.4 \cdot 10^{-5}$ mol·L$^{-1}$) to NO$_2$. 
Figure S14. Mass spectra (MALDI-TOF) (matrix DCTB) of Ir(Cs)acac after exposure of toluene solutions to NO₂ (C \approx 1 \cdot 10^{-5} \text{ mol.L}^{-1}). The lower part is the zoom-in of the area with main peaks.

Figure S15. Absorption spectra of Pt(TPTBPF) dissolved in toluene (C \approx 5 \cdot 10^{-6} \text{ mol.L}^{-1}) before (0 min) and after (1-11 min) exposure to NO₂ (C \approx 2.2 \cdot 10^{-4} \text{ mol.L}^{-1}).
Figure S16. Response of luminescence intensity (above) and decay time (below) of PtPTBPF in toluene (C ~ $5 \cdot 10^{-6}$ mol L$^{-1}$) to NO$_2$. Note that due to extremely low luminescence intensity in presence of NO$_2$ reliable measurement of the luminescence decay time is not possible.
Figure S17. Mass spectra (MALDI-TOF) (matrix DCTB) of PtTPTBP after exposure of toluene solutions to NO₂ (C ~ 2.2 × 10⁻⁴ mol L⁻¹, upper part; C ~ 4.4 × 10⁻⁴ mol L⁻¹, lower part).

Figure S18. Absorption spectra of Ru(dpp)₃(TMS) dissolved in toluene (C ~ 2 × 10⁻⁵ mol L⁻¹) before (0 min) and after (1-11 min) exposure to NO₂ (C ~ 6 × 10⁻⁴ mol L⁻¹ added in 4 portions).
Figure S19. Response of luminescence intensity (above) and decay time (below) of Ru(dpp)$_3$(TMS)$_2$ in toluene ($C \sim 2 \cdot 10^{-5}$ mol L$^{-1}$) to NO$_2$.

Figure S20. Mass spectrum (MALDI-TOF) (matrix DCTB) of Ru(dpp)$_3$(TMS)$_2$ after exposure of toluene solution to NO$_2$. 
Figure S21. Absorption spectra of PtOEP dissolved in toluene (C \( \sim 8 \cdot 10^{-6} \text{ mol L}^{-1} \)) before (black line) and after (1-9 min) exposure to NO\(_2\) (C \( \sim 1.5 \cdot 10^{-4} \text{ mol L}^{-1} \)), gray lines. Red line shows absorption spectrum after NO\(_2\) was removed by bubbling nitrogen through the solution for 15 min.

Figure S22. Mass spectrum (MALDI-TOF) (matrix DCTB) of PtOEP after exposure of toluene solution to NO\(_2\).
Figure S23. Comparison of normalized luminescence lifetime of sensor foils of (a) PtTFPP and (b) PtTPTBPF in different polymers, before exposure to NO\textsubscript{2}, after exposure to 180 ppm NO\textsubscript{2}, and after exposure to 5500 ppm NO\textsubscript{2}. Time of exposure was about 15 minutes in all cases.
Figure S24. Comparison of normalized luminescence intensity (top) and lifetime (bottom) of sensor foils of Pt8SO2TPTBP in different polymers, before exposure to NO2, after exposure to 180 ppm NO2, and after exposure to 5500 ppm NO2. Time of exposure was about 15 minutes in all cases.

Table S5. Fit parameters for the decay time-based Stern-Volmer plots (fit with eq.3) obtained for immobilized Pt8SO2TPTBP

| Polymer | NO2 | Quencher | O2 |
|---------|-----|----------|----|
|         | $K_{SV1}, \text{hPa}^{-1}$ | f | $R^2$ | $K_{SV1}, \text{hPa}^{-1}$ | f | $R^2$ |
| PS     | 0.34 | 0.65 | 0.996 | 0.020 | 0.86 | 0.999 |
| M99    | 0.42 | 0.50 | 0.987 | 0.011 | 0.90 | 0.999 |
| pTFEMA | 0.46 | 0.85 | 0.999 | 0.035 | 0.94 | 0.999 |
| M127   | 0.74 | 0.81 | 0.999 | 0.039 | 0.90 | 0.999 |
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