Supplementary Information (SI) for RSC Applied Interfaces.

Utilizing a Pickering Emulsion for Suzuki-Miyaura Coupling with an Amine-Coordinated Pd Catalyst

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Fig. S8 Pd 3d Spectra of GO-DAP-PdCl$_2$ after 6 cycling.

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Fig. S9 Mechanism Analysis of the Suzuki-Miyaura coupling reaction.

Table S1. Suzuki coupling reaction substrate expansion.

Table S2. Comparison of initial reaction rates (r_0) for Suzuki-Miyaura coupling catalyzed by GO-PdCl$_2$, homogeneous DAP-PdCl$_2$, and GO-DAP-PdCl$_2$ Pickering emulsion under identical conditions.

Table S3. The total interfacial area of the emulsion formed at different oil-water ratios and the corresponding initial reaction rates.

Information 1. Preparation of GO

The specific operation was as follows: firstly, 5 g of graphite and 2.5 g of NaNO$_3$ were added into 130 mL of concentrated H$_2$SO$_4$ and stirred for 2 h in an ice bath. then, 15 g of KMnO$_4$ powder was added slowly over a period of 3 h at 0−5 °C. The solution was then transferred to a water bath at 35 °C, and 230 mL of deionised water was added slowly with continuous stirring for 1 h. The temperature of the water bath was then adjusted to 98 °C , and the solution was stirred for 30 min. After the heating was turned off, 400 mL of deionised water and 10 mL of H$_2$O$_2$ were added to remove the incompletely reacted KMnO$_4$. Finally, the precipitates were left to settle for a few days, then centrifuged and washed to be neutral, and then finally, the concentration was calibrated and set aside.

Information 2. Initial rate kinetics

Experimental design: Reaction conditions were kept consistent with the main reaction (85 °C, K$_2$CO$_3$, identical substrate ratio). Only the reaction conversion within the first 5 min was recorded.

- Calculation formula： $r_0 = \dfrac{\Delta n_{product}}{\Delta t}$, Here, r_0 represents the initial reaction rate

  within 5 min (unit: mol/h), $\Delta n_{product}$ represents the amount of product formed within

  5 min (calculated based on an initial iodobenzene amount of 1 mmol), and Δt is the

  reaction time.

Calculation of emulsion interfacial area:

- Calculation formula： $S = \dfrac{6a \bullet Ve}{D}$, Here, S represents the total interfacial area of

  the emulsion formed by the emulsifier (unit: m²), a is the spatial packing efficiency

  of emulsion droplets (in this case, assuming hexagonal close packing, a = 74%),

  Ve is the volume of the emulsion formed, and D is the average diameter of the

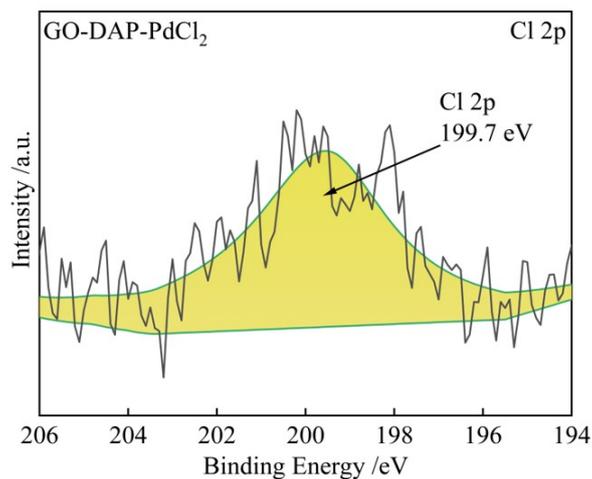 droplets.

Fig. S1 Pd 3d spectra of GO-DAP-PdCl$_2$.

Fig. S2 Cl 2p spectra of GO-DAP-PdCl$_2$.
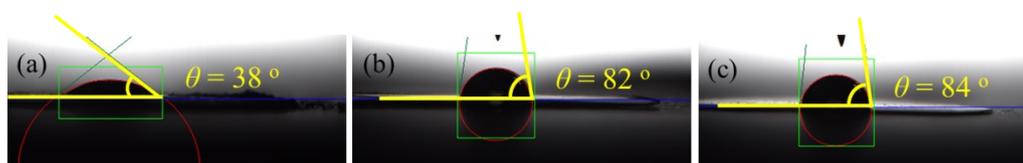

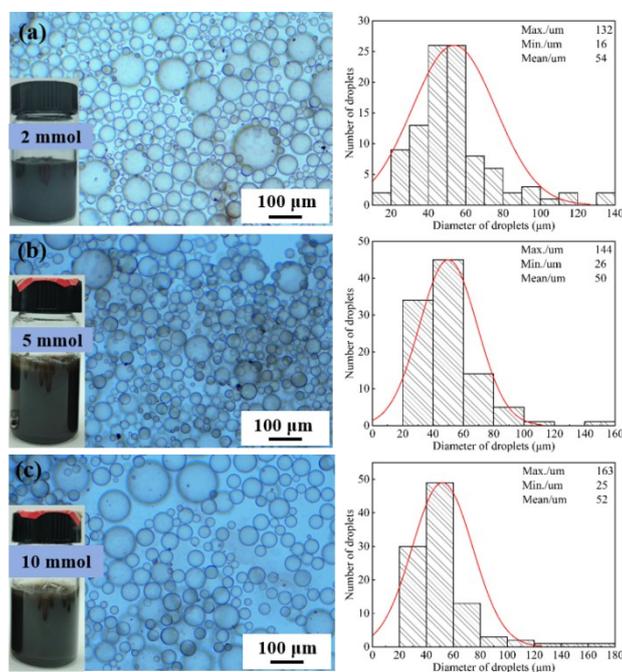**Fig. S3** Water contact angles of GO (a), GO-DAP (b) and GO-DAP-PdCl$_2$ (c).

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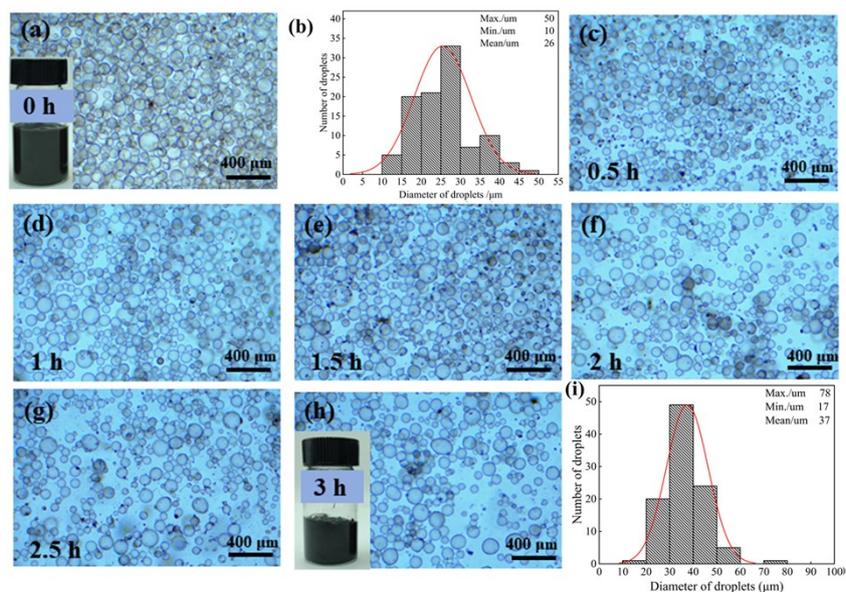
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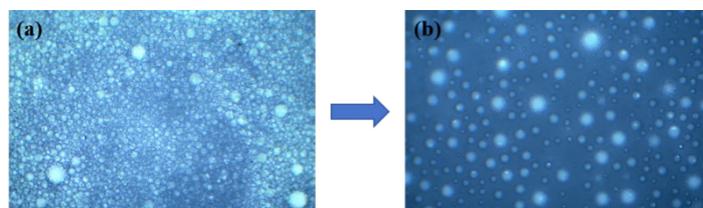

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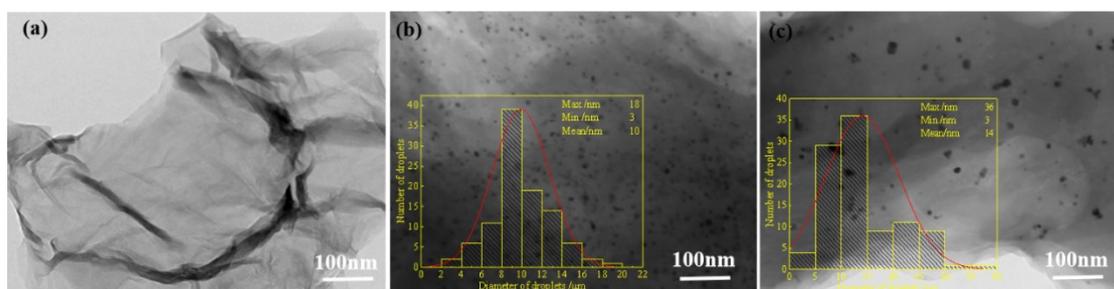

Fig. S7 TEM images of fresh catalyst (a) and catalyst after cycling 5 and 6 times (b–c).
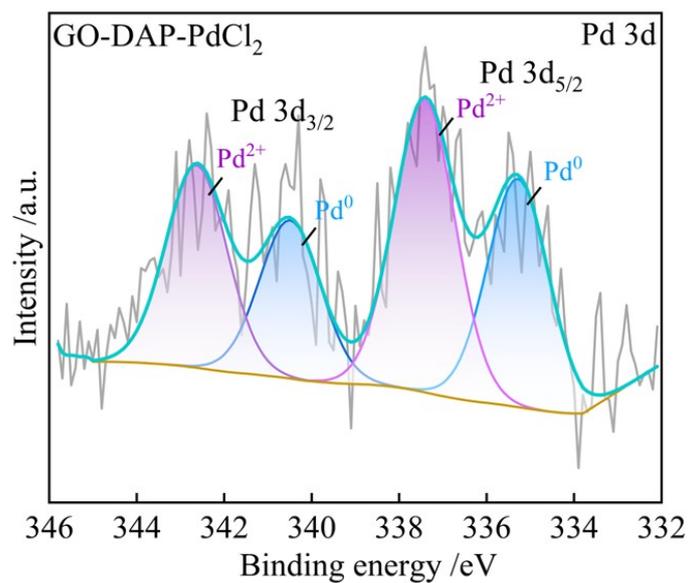
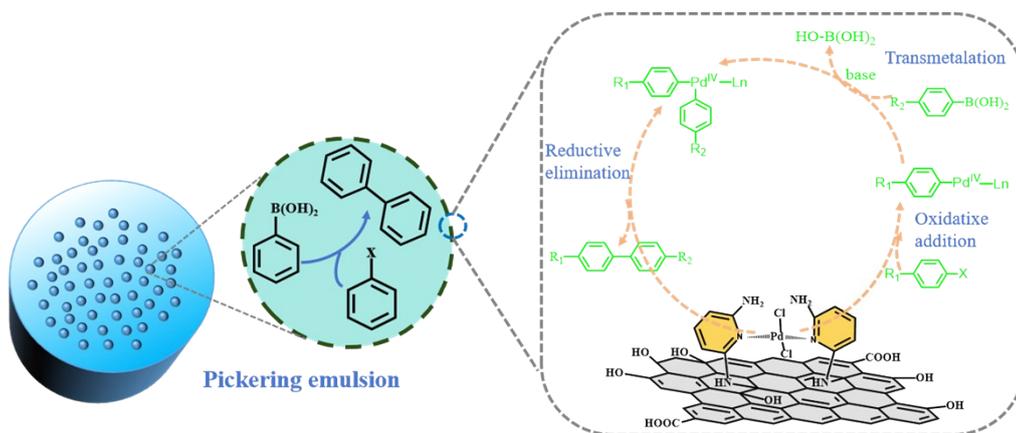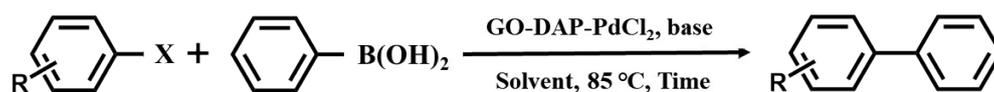**Fig. S8** Pd 3d Spectra of GO-DAP-PdCl$_2$ after 6 cycling.

Fig. S9 Mechanism Analysis of the Suzuki-Miyaura coupling reaction.

Table S1. Suzuki coupling reaction substrate expansion.

Entry	R	X	Conversion (%)
1	H	I	95
2	2-MeO	I	91
3	3-MeO	I	93
4	4-MeO	I	83
5	4-Me	I	84
6	4-NO$_2$	I	90
7	H	Br	58
8	H	Cl	2

Reaction conditions: 1 mmol iodobenzene, 2 mmol phenylboric acid, 2 mmol K$_2$CO$_3$, 6 mg GO-DAP-PdCl$_2$, 8 mL H$_2$O, 85 °C

Table S2. Comparison of initial reaction rates (r_0) for Suzuki-Miyaura coupling catalyzed by GO-PdCl$_2$, homogeneous DAP-PdCl$_2$, and GO-DAP-PdCl$_2$ Pickering emulsion under identical conditions.

Catalytic system	Conversion rate within 5min	r_0 (mol/h)
GO-DAP-PdCl$_2$	8%	9.6×10^{-4}
DAP-PdCl$_2$ (Homogeneous）	22%	2.64×10^{-3}
GO-DAP-PdCl$_2$	78%	9.36×10^{-3}

Table S3. The total interfacial area of the emulsion formed at different oil-water ratios and the corresponding initial reaction rates.

oil-water ratios	S (m^2)	r_0 (mol/h)
1：7	45.54	7.44×10^{-3}
1：10	52.24	7.92×10^{-3}
1；14	57.29	8.16×10^{-3}
1：23	71.04	8.76×10^{-3}
1：70	84.57	9.36×10^{-3}