# 加载必要的包

library(readxl)

library(ggplot2)

library(dplyr)

# 读取数据

data <- read\_xlsx("data3.xlsx")

data$group <- factor(data$group, levels = c("400 nN", "0 nN"))

# 设置颜色（点色，线色）

#point\_color <- c("400 nN" = "#ff68ff", "0 nN" = "#26cccc") #文章颜色

#line\_color <- c("400 nN" = "#8a088a", "0 nN" = "#0a7878") #文章颜色

point\_color <- c("400 nN" = "#ff9900", "0 nN" = "#66ccff")

line\_color <- c("400 nN" = "#ff0404", "0 nN" = "#0134cc")

# 计算每组数据的拟合结果

fit\_data <- data %>%

group\_by(group) %>%

do({

# 生成平滑曲线

fit <- smooth.spline(.$`wavelength`, .$`intensity`, spar = 0.5) # 平滑参数，控制曲线的平滑程度。值越小，拟合的曲线越贴近原始数据；值越大，曲线越平滑。

# 预测密集点

fit\_df <- data.frame(

`wavelength` = seq(min(.$`wavelength`), max(.$`wavelength`), length.out = 1000), # 这里生成了 1000 个点（可根据自己的数据量进行调整）

`intensity` = predict(fit, seq(min(.$`wavelength`), max(.$`wavelength`), length.out = 1000))$y,

group = unique(.$group)

)

fit\_df

})

# 先创建一个基本的 ggplot 对象

ggplot(data, aes(x = wavelength, y = intensity, color = group, shape = group)) +

# 先添加 400 nN 组的几何对象

geom\_point(data = subset(data, group == "400 nN"), color = point\_color["400 nN"], size = 0.75, stroke = 0.6) +

geom\_line(data = subset(fit\_data, group == "400 nN"), size = 0.75) +

# 再添加 0 nN 组的几何对象

geom\_point(data = subset(data, group == "0 nN"), color = point\_color["0 nN"], size = 0.75, stroke = 0.6) +

geom\_line(data = subset(fit\_data, group == "0 nN"), size = 0.75) +

scale\_color\_manual(values = line\_color) +

scale\_shape\_manual(values = c(21, 21)) +

guides(shape = guide\_legend(override.aes = list(size = 2, linetype = 1, stroke = 1.2, fill = "white"))) +

scale\_y\_continuous(limits = c(0, 8.5),

expand = c(0, 0),

breaks = seq(0, 8, 2)) +

scale\_x\_continuous(expand = c(0, 0)) +

labs(x = "Wavelength (nm)", y = "Normalized emission intensity") +

theme\_classic(base\_size = 12) +

theme(axis.text = element\_text(size = 11, color = "black"),

legend.title = element\_blank(),

legend.position = c(0.2, 0.9))

ggs