## Reported organic spacers in DJ perovskites (experimental)

$$H_3N \xrightarrow{\oplus} MH_3$$

[1,0,1,2,0,1,0,0,0,0,0,0,0]

$$H_3N \overset{\scriptsize\textcircled{\tiny\dag}}{\bigvee} NH_3$$

[1,0,1,2,0,2/3,0,0,0,0,0,0]

$$H_3\overset{\oplus}{N} \qquad \qquad \overset{\oplus}{\bigvee} \qquad \qquad \mathring{N}H_3$$

[1,0,1,2,2,1,0,0,0,0,0,0]

$$\overset{\mathsf{H}_3\mathsf{N}}{\oplus}\overset{\mathsf{N}_3\mathsf{N}}{\oplus}$$

[1,0,1,2,2,1,0,0,0,0,0,0]

[1,0,1,2,4,1,0,0,0,0,0,0,0]

[1,0,1,2,2,1,0,4,0,0,0,0]

[1,0,1,1,1,1,0,0,0,0,0,0,0]

[1,0,1,1,1,2/3,0,0,0,0,0,0]

$$HN \xrightarrow{\bigoplus} MH_3$$

[1,0,1,1,2,2/3,0,0,0,0,0,0]

[1,0,1,1,1,2/3,0,0,0,0,1,0]

[2,0,1,2,0,3/5,0,0,0,0,0,0]

$$\mathsf{H}_{3}\overset{\oplus}{\mathsf{N}}$$

[2,1,1,2,2,1,0,0,0,0,0,0]

[2,1,1,2,2,1,0,1,0,0,0,0]

[2,1,0.5,2,2,1,0,1,0,0,0,0]

$$H_3N$$
  $S$   $NH_3$ 

[1,0,0,2,2,1,0,0,0,0,0,0]

$$H_3\overset{\textcircled{\tiny{\textcircled{\tiny }}}}{\textstyle{\textstyle{\bigcap}}}\overset{\textcircled{\tiny{\textcircled{\tiny }}}}{\textstyle{\textstyle{\bigcap}}}\overset{\textcircled{\tiny{\textcircled{\tiny }}}}{\textstyle{\textstyle{\bigcap}}}\overset{\textcircled{\tiny{\textcircled{\tiny }}}}{\textstyle{\textstyle{\bigcap}}}H_3$$

[2,1,0,2,2,1,0,0,0,0,0,0]

[2,1,0,2,4,1,0,0,0,0,0,0,0]

[3,1,0,2,4,1,0,0,0,0,0,0,0]

[4,1,0,2,4,1,0,0,0,0,0,0,0]

[2,0,0,2,2,1,0,0,0,0,0,0]

[1,0,0,1,2,1/2,0,0,0,1,0,0]

## Reported organic spacers in DJ perovskites (theoretical only)

[3,0,1,2,0,1,0,0,0,0,0,0]

[3,0,1,2,4,1,0,0,0,0,0,0,0]

[5,0,1,2,2,1,0,0,0,0,0,0,0]

[2,1,1,2,0,1,0,0,0,0,0,0,0]

$$\mathsf{H_3N}^{\bigoplus}$$

[2,1,1,2,4,1,0,0,0,0,0,0,0]