

a

$$\min \sum_{j \in \mathbf{M}} (v_j^{\text{framework}} - v_j^{\text{experimental}})^2 \quad (1)$$

$$\left\{ \begin{array}{l} \max v_{\text{objective}} \end{array} \right. \quad (2)$$

$$s.t. \left\{ \begin{array}{l} v_j^{\text{framework}} \geq 0 \quad \forall j \in \mathbf{M} \end{array} \right. \quad (3)$$

$$s.t. \left\{ \begin{array}{l} \sum_{j=1}^M S_{ij} v_j^{\text{framework}} = 0 \quad \forall i \in \mathbf{N} \end{array} \right. \quad (4)$$

$$\left\{ \begin{array}{l} v_{\text{glucose}}^{\text{framework}} = \text{uptake} \end{array} \right. \quad (5)$$

b

$$\min \sum_{j \in \mathbf{M}} (v_j^{\text{framework}} - v_j^{\text{experimental}})^2 \quad (1)$$

$$s.t. \left\{ \begin{array}{l} v_{\text{objective}} = \text{uptake} \bullet g \end{array} \right. \quad (2)$$

$$\left\{ \begin{array}{l} v_j \geq 0 \quad \forall j \in \mathbf{M} \end{array} \right. \quad (3)$$

$$\left\{ \begin{array}{l} \sum_{j=1}^M S_{ij} v_j = 0 \quad \forall i \in \mathbf{N} \end{array} \right. \quad (4)$$

$$\left\{ \begin{array}{l} v_{\text{glucose}}^{\text{framework}} = \text{uptake} \end{array} \right. \quad (5)$$

$$\left\{ \begin{array}{l} v_{\text{objective}}^{\text{framework}} = \text{norm} \end{array} \right. \quad (6)$$

$$\left\{ \begin{array}{l} \sum_{i=1}^N u_i S_{ij} \geq 1 \quad j \in \mathbf{P} \end{array} \right. \quad (7)$$

$$\left\{ \begin{array}{l} \sum_{i=1}^N u_i S_{ij} \geq 0 \quad \forall j \in \mathbf{M} \cap \notin \mathbf{P} \cap \notin \text{glucose uptake} \end{array} \right. \quad (8)$$

$$\left\{ \begin{array}{l} \sum_{i=1}^N u_i S_{ij} + g \geq 0 \quad \forall j \in \text{glucose uptake} \end{array} \right. \quad (9)$$