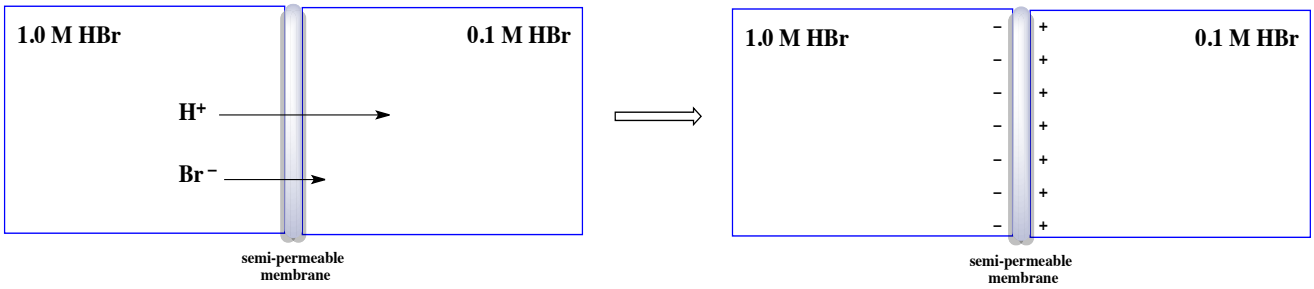
CONCEPT: JUNCTION POTENTIAL

A *junction potential* is created at the interface between two ionic solutions if there is a difference in the _____ of the solutions and difference in _____ of the ions.

- This creates a negligible amount of voltage at the ends of the salt bridge connecting the two half cells.



$$E_{Cell} = E_{Ind} - E_{Ref} + E_j$$

Mobility of ions is based on their size and the greater the difference in sizes between the two ions the greater the potential.

Ion	Mobility $\left[\frac{m^2}{s \cdot V}\right]^a$	Ion	Mobility $\left[\frac{m^2}{s \cdot V}\right]^a$
H^+	36.30 x 10^{-8}	$Fe(CN)_6^{4-}$	11.45 x 10^{-8}
Rb^+	7.92 x 10^{-8}	$Fe(CN)_6^{3-}$	10.47 x 10^{-8}
K^+	7.62 x 10^{-8}	SO_4^{2-}	8.27 x 10^{-8}
NH_4^+	7.61 x 10^{-8}	Br^-	8.13 x 10^{-8}
La^{3+}	7.21 x 10^{-8}	I^-	7.96 x 10^{-8}
Ba^{2+}	6.59 x 10^{-8}	Cl^-	7.91 x 10^{-8}
Ag^+	6.42 x 10^{-8}	NO_3^-	7.40 x 10^{-8}
Ca^{2+}	6.12 x 10^{-8}	ClO_4^-	7.05 x 10^{-8}
Cu^{2+}	5.56 x 10^{-8}	F^-	5.70 x 10^{-8}
Na^+	5.19 x 10^{-8}	HCO_3^-	4.61 x 10^{-8}
Li^+	4.01 x 10^{-8}	$CH_3CO_2^-$	4.24 x 10^{-8}
OH^-	20.50 x 10^{-8}		

Junction	Potential (mV)
0.1 M NaCl | 0.1 M KCl	–6.4
0.1 M NaCl | 3.5 M KCl	–0.2
1.0 M NaCl | 3.5 M KCl	–1.9
0.1 M HCl | 0.1 M KCl	+27
0.1 M HCl | 3.5 M KCl	+3.1

How can we reduce the salt bridge's junctional potential?

- You can use KCl because the two ions have similar mobility values.

EXAMPLE: Which side of the $0.5\ M\ NaBr|0.5\ M\ KBr$ junction will be more negative?