WHAT IS CLAIMED IS:

1. An electrochromic device (100) comprising:

a first electrode (126a), second electrode (126b) and an electrochromic composition including one or more electrochromic materials;

wherein at least one of the one or more electrochromic materials undergoes electron exchange only at either the first electrode or at the second electrode,

wherein the electrochromic device (100) further comprises a selectively permeable membrane (270) within the electrochromic composition and disposed between the first (126a) and second electrode (126b), wherein the membrane (270) has a center portion and a peripheral portion, characterized in that the center portion has a permeability higher than that of the peripheral portion.

2. The electrochromic device (100) of claim 1, wherein either or both of the first electrode (126a) or the second electrode (126b) comprise a semiconductor material at an interface with the electrochromic composition.

3. The electrochromic device (100) of claim 1, wherein the first electrode (126a) includes a material that is different than a material of the second electrode (126b).

4. The electrochromic device (100) of claim 1, wherein the electrochromic composition is disposed between and in contact with the first electrode (126a) and second electrode (126b) and configured to change light transmission from one state to another state in response to an input signal between the electrodes.

5. The electrochromic device (100) of claim 1, wherein the electrochromic composition is configured to change light transmission from one state to another state in response to an input signal.

6. The electrochromic device (100) of claim 1, wherein the electrochromic composition is configured to change visible light transmission from one state to another state in response to an input signal.

7. The electrochromic device (100) of claim 1, wherein the electrochromic composition includes a cathodic compound and an anodic compound as the one or more electrochromic materials and wherein either or both of the first electrode (126a) or the second electrode (126b) selectively allows

reducing and oxidizing substantially only the cathodic compound and/or its reduced forms, while substantially prohibiting reduction and oxidation of the anodic compound.

8. The electrochromic device (100) of claim 1, wherein the electrochromic composition includes a cathodic compound and an anodic compound as the one or more electrochromic materials and wherein either or both of the first electrode or the second electrode selectively allows reducing and oxidizing substantially only the anodic compound and/or its oxidized forms, while substantially prohibiting reduction and oxidation of the cathodic compound.

9. The electrochromic device (100) of claim 1, wherein the first electrode (126a), second electrode (126b), and electrochromic composition define a variable transmittance layer (VTL) (120), and wherein the VTL (120) has electrical properties that are different in a central portion of the VTL (120) than in a periphery of the VTL (120).

10. The electrochromic device (100) of claim 1, wherein the electrochromic composition is in the form of a gel.

11. The electrochromic device (100) of claim 10, wherein the electrochromic layer (121) in the form of the gel has electrical properties that are substantially different in different areas of the gel in a lateral direction of the gel.

12. The electrochromic device (100) of claim 1, further comprising a controller (110) to apply the input signal, wherein the controller (110) is electrically connected to the first and second electrodes (126a, 126 b) by distributed, multi-point electrical connections (112a, 112b) to minimize ohmic drops across the electrodes and/or wherein the controller (110) is configured to operate both electrodes at ion-transfer limiting conditions of the electrochromic composition.