AgGa0.5In0.5Se2 thin films were deposited onto a quartz substrate by the electron-beam technique. For the investigation of the annealing effect on structural, optical and electrical properties of deposited films, samples were annealed in the temperature range 300–775 °C. The composition analyses of the deposited films carried out by energy dispersive x-ray analysis measurements have shown that the deposited AgGa0.5In0.5Se2 films were indium- and gallium-rich but selenium- and slightly silver-deficient and there was a remarkable change in composition with annealing. As a result of x-ray diffraction measurements, the as-deposited films were found to have an amorphous structure and after annealing at 300 °C a polycrystalline structure with different phases was observed. However, subsequent annealing resulted in the formation of single phase AgGa0.5In0.5Se2 thin film at about 775 °C. The absorption coefficient of the films was determined from the transmission spectra and the band gap values were calculated and found to vary between 1.57 and 2.43 eV following annealing in the temperature range 300–775 °C. The refractive index (*n*) and extinction coefficient (*k*) of the films were evaluated by applying the envelope method to the transmission spectra. The spectral distributions of these quantities for both as-deposited and annealed films were determined in detail and it was observed that there has been a remarkable influence of annealing on these quantities. The electrical properties of AgGa0.5In0.5Se2 thin films were also investigated by means of temperature dependent conductivity measurements in the temperature range 100–460 K. The resistivity of the samples depending on the annealing temperature varied between 6.5 × 105 and 16 ? cm. As a result of the hot-probe method it was observed that the as-deposited films have indicated an n-type behaviour, while all the annealed AgGa0.5In0.5Se2 thin films have shown p-type conduction