REENCON-XXI Международный Конгресс. Возобновляемая энергетика XXI век: энергетическая и экономическая эффективность

МНОГОСЛОЙНЫЕ ГИБРИДНЫЕ СОЛНЕЧНЫЕ БАТАРЕИ НА ОСНОВЕ КРИСТАЛЛИЧЕСКАОГО КРЕМНИЯ И СОПРЯЖЕННЫХ ПОЛИМЕРОВ

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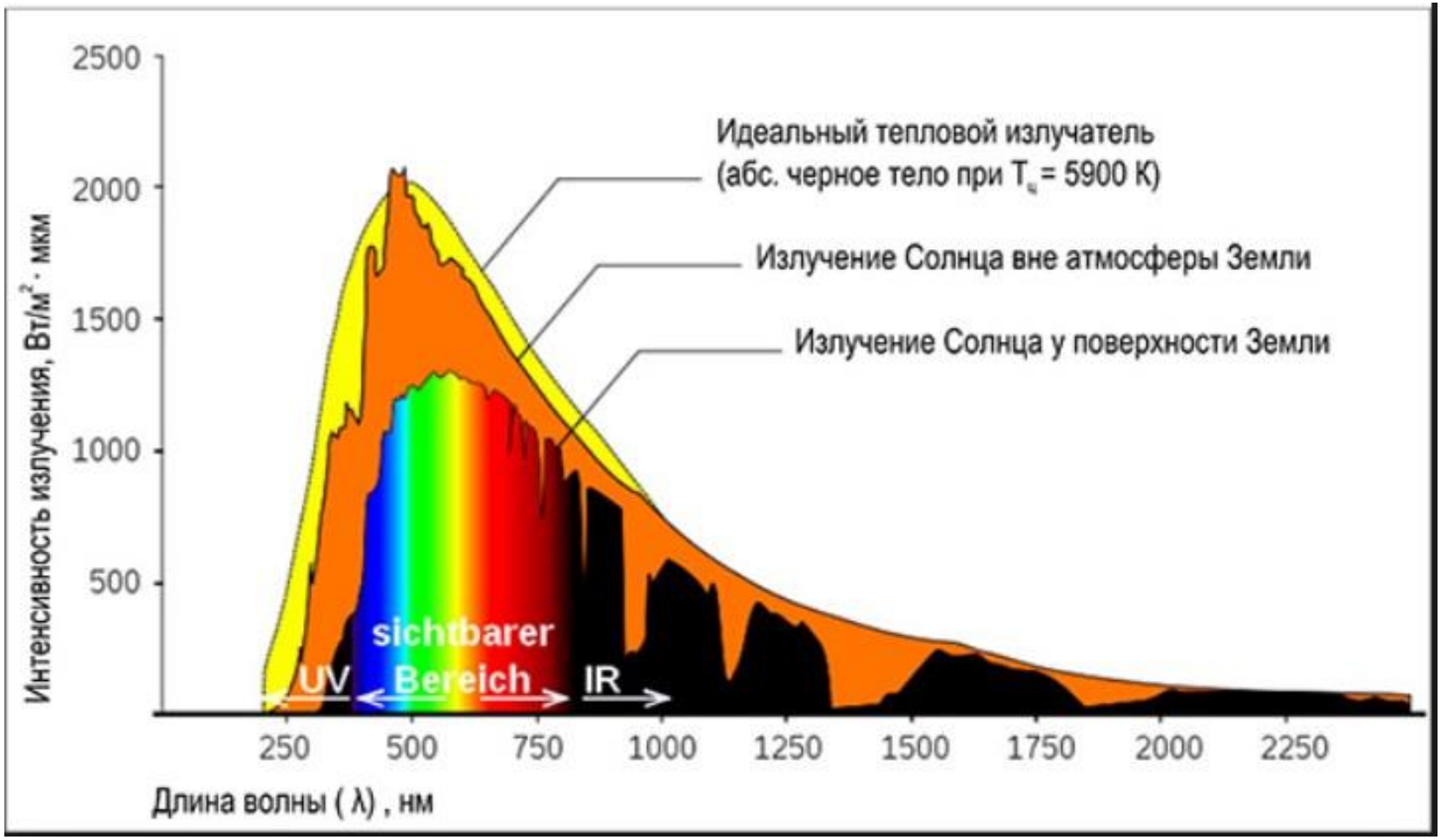
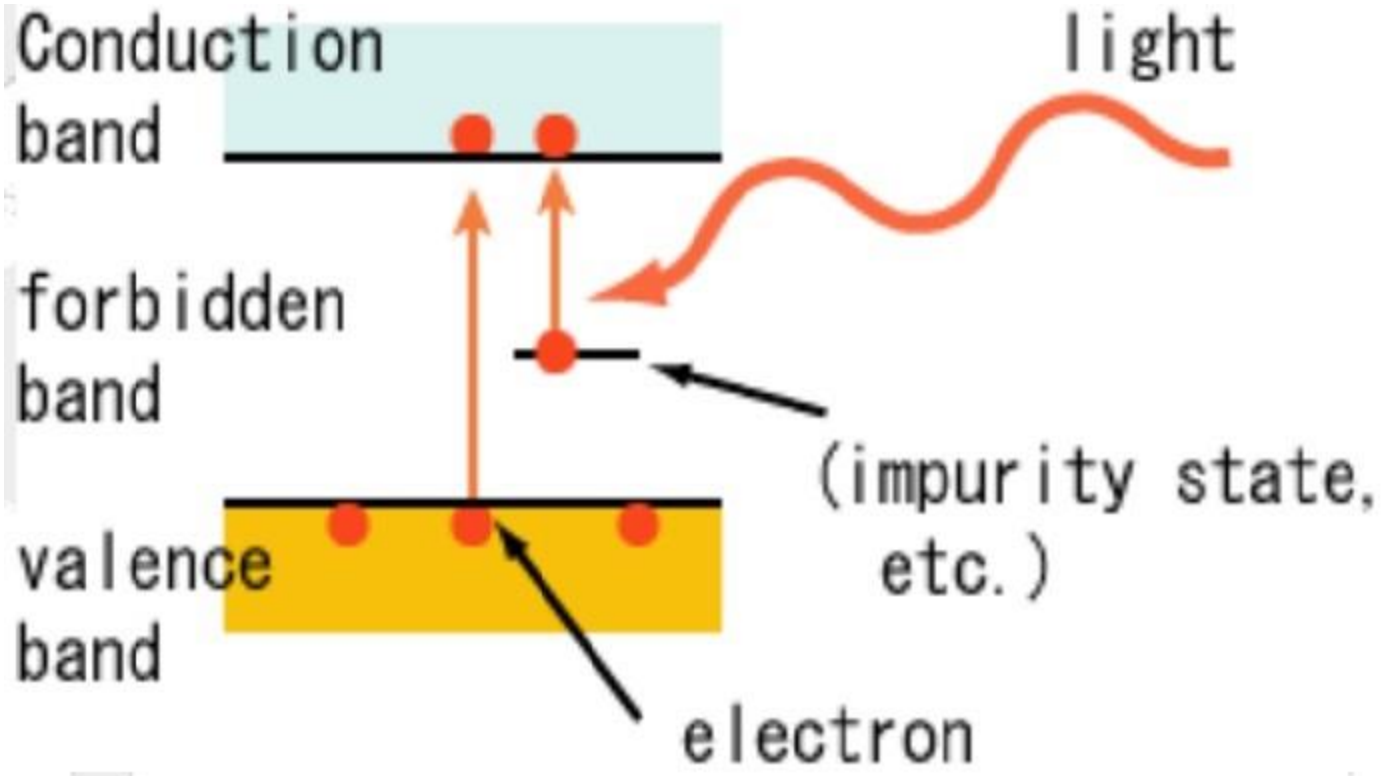
Annotation

- Multi-hybrid solar cells based on crystalline silicon and conjugated polymers with low content of defects were developed and studied for the first time. The results obtained suggest, that in the near future, this type of solar cells will allow increase the solar cells efficiency for 5 - 10% without any noticeable increase of their cost. In this article construction of multi-hybrid solar cells contain one layer of inorganic semiconductor and one or two layers conjugated polymers with very low content of defects. In optical spectra of such polymers there is no long wave tails and absorption bands alternate with transparency windows. It is shown for the first time that doping of such conjugated polymers by nonoxidizing protonic acids leads to disappearance of absorption bands in visual region and appearance of absorption band in near infrared region. In the two-layer solar cell, the polymer layer may be disposed on the surface or back side of silicon plate. In the three-layer solar cell, the first polymer layer may be disposed on the surface of the silicon plate and the second polymer layer on the reverse side. The top polymer layer is protected by the glass with ITO.

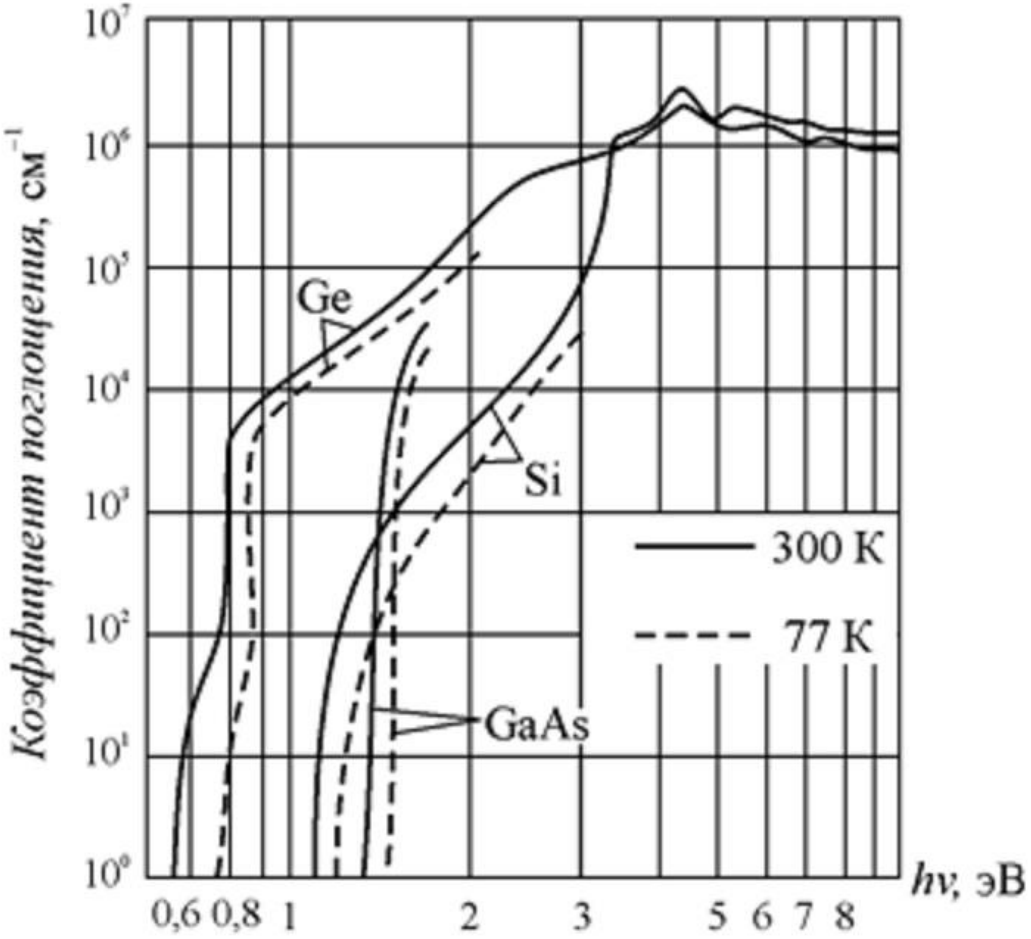
Спектр солнечного излучения



Запрещенная зона неорганического (органического) полупроводника

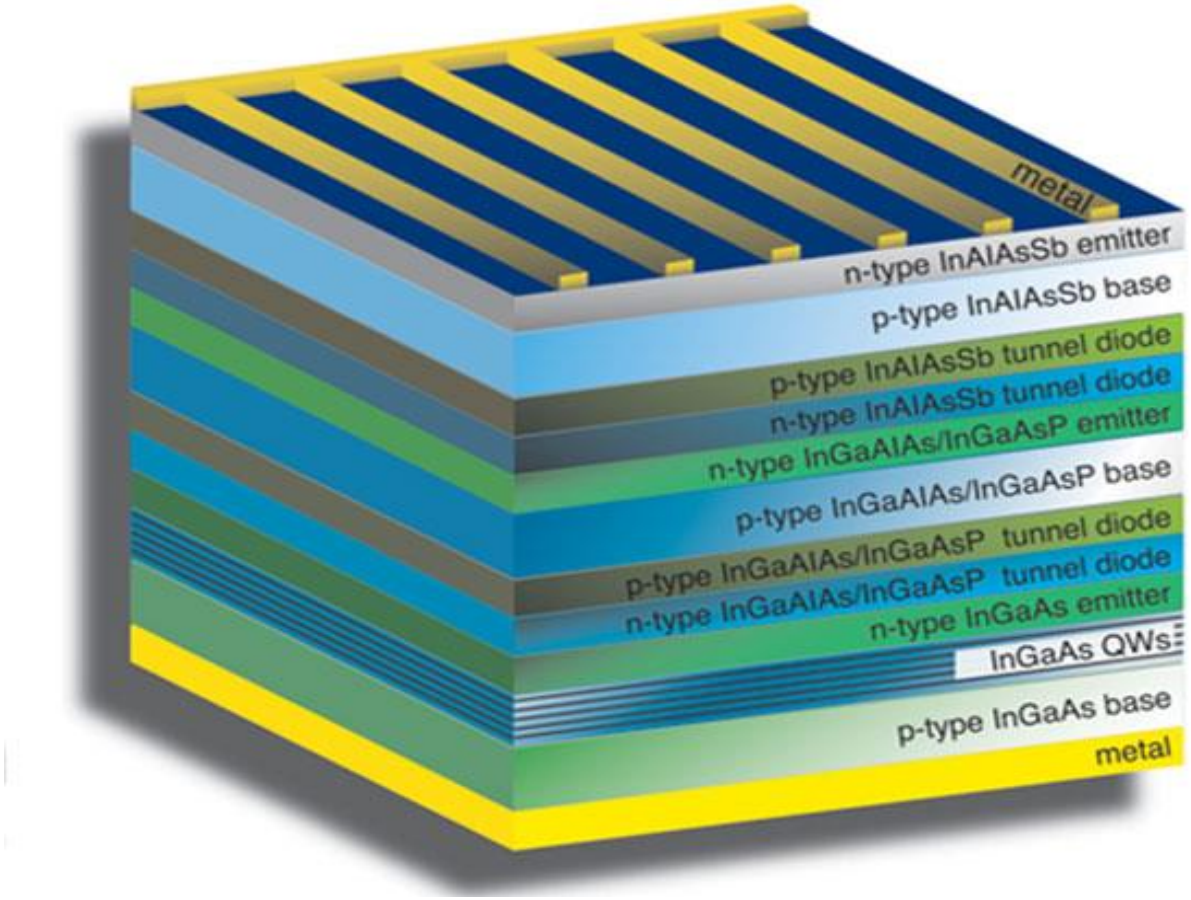


Спектры поглощения неорганических полупроводников

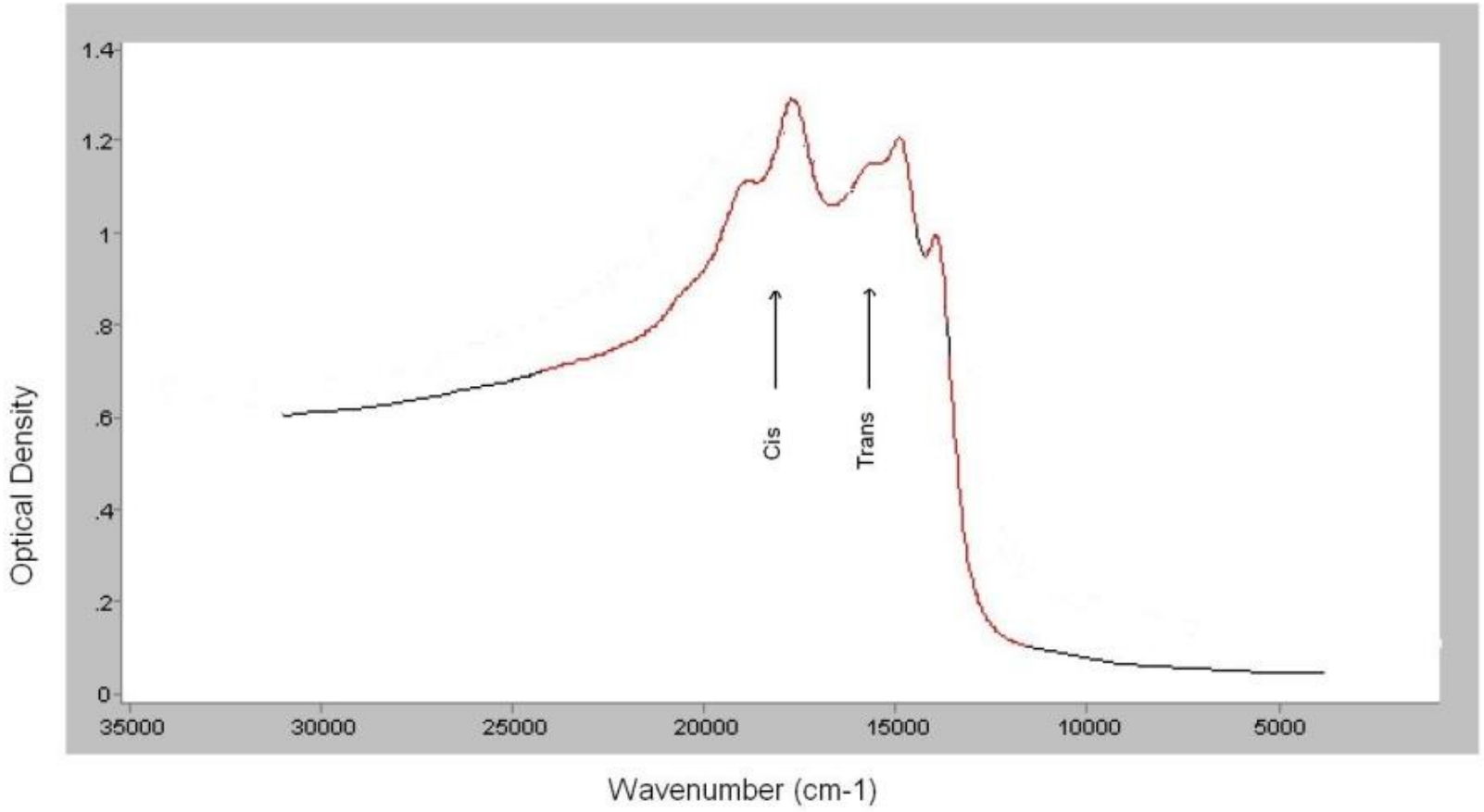


Конструкция 11-слойной солнечной батареи на основе неонрганических полупроводников.

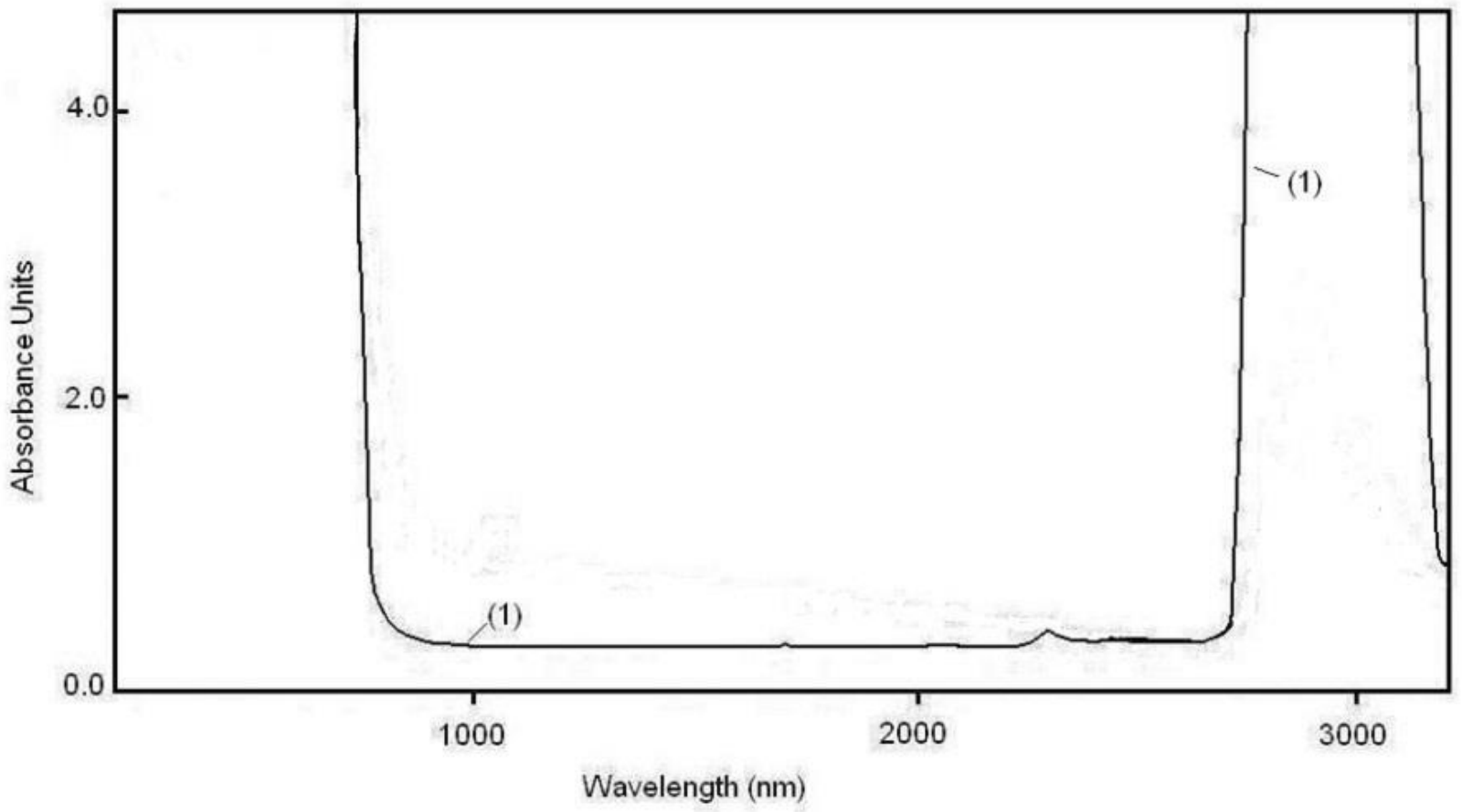
Теоретический КПД 87%



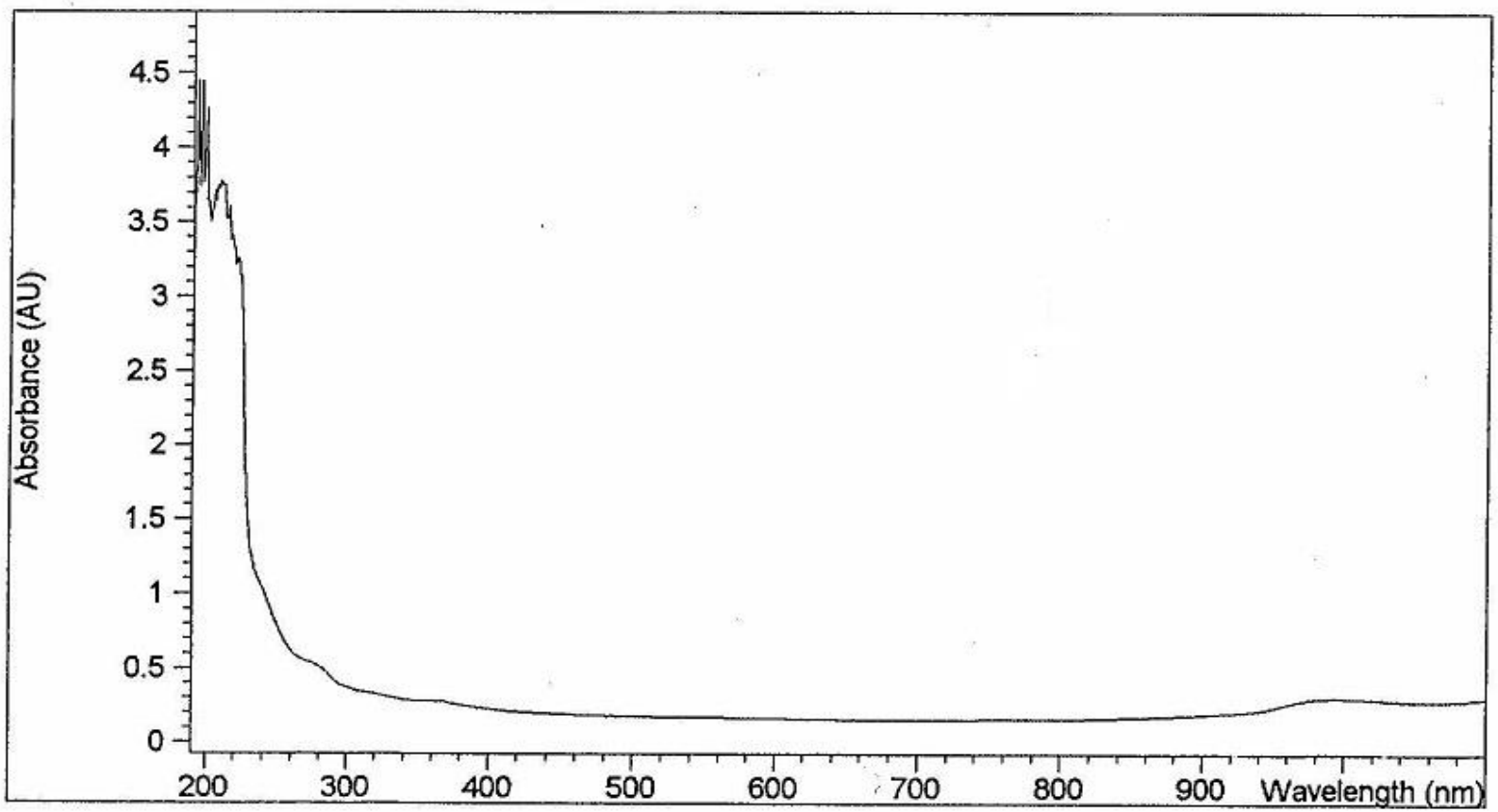
Спектр поглощения тонкой (5 мкм) пленки низкодефектного нанополиацетилена



Спектр поглощения толстой (500 мкм) пленки низкодефектного нанополиацетилена



Спектр поглощения пленки НПА толщиной 50 мкм. Пленка обработана трифторуксусной кислотой.



Спектр поглощения пленки НПА толщиной 50 мкм. Пленка обработана трифторуксусной кислотой.